Service Manual

Model : U250/KU250

Service Manual

U250/KU250

Date: June, 2007 / Issue 1.0

Table Of Contents

1. INTRODUCTION

1.1 Purpose

This manual provides the information necessary to repair, calibration, description and download the features of this model.

1.2 Regulatory Information

A. Security

Toll fraud, the unauthorized use of telecommunications system by an unauthorized part (for example, persons other than your company's employees, agents, subcontractors, or person working on your company's behalf) can result in substantial additional charges for your telecommunications services. System users are responsible for the security of own system. There are may be risks of toll fraud associated with your telecommunications system. System users are responsible for programming and configuring the equipment to prevent unauthorized use. The manufacturer does not warrant that this product is immune from the above case but will prevent unauthorized use of commoncarrier telecommunication service of facilities accessed through or connected to it. The manufacturer will not be responsible for any charges that resultfrom such unauthorized use.

B. Incidence of Harm

If a telephone company determines that the equipment provided to customer is faulty and possibly causing harm or interruption in service to the telephone network, it should disconnect telephone service until repair can be done. A telephone company may temporarily disconnect service as long as repair is not done.

C. Changes in Service

A local telephone company may make changes in its communications facilities or procedure. If these changes could reasonably be expected to affect the use of the phones or compatibility with the net work, the telephone company is required to give advanced written notice to the user, allowing the user to take appropriate steps to maintain telephone service.

D. Maintenance Limitations

Maintenance limitations on the phones must be performed only by the manufacturer or its authorized agent. The user may not make any changes and/or repairs expect as specifically noted in this manual. Therefore, note that unauthorized alternations or repair may affect the regulatory status of the system and may void any remaining warranty.

E. Notice of Radiated Emissions

This model complies with rules regarding radiation and radio frequency emission as defined by local regulatory agencies. In accordance with these agencies, you may be required to provide information such as the following to the end user.

F. Pictures

The pictures in this manual are for illustrative purposes only; your actual hardware may look slightly different.

G. Interference and Attenuation

A phone may interfere with sensitive laboratory equipment, medical equipment, etc. Interference from unsuppressed engines or electric motors may cause problems.

H. Electrostatic Sensitive Devices

ATTENTION

Boards, which contain Electrostatic Sensitive Device (ESD), are indicated by the  sign.
Following information is ESD handling:

- Service personnel should ground themselves by using a wrist strap when exchange system boards.
- When repairs are made to a system board, they should spread the floor with anti-static mat which is also grounded.
- Use a suitable, grounded soldering iron.
- Keep sensitive parts in these protective packages until these are used.
- When returning system boards or parts like EEPROM to the factory, use the protective package as described.

2. PERFORMANCE

2.1 System Overview

Item	Specification
Shape	GSM900/1800/1900 and WCDMA2100 - Bar type Handset
Size	110.9 X 46.7 X 15.6 mm
Weight	Under 83 g (with 950mAh Battery)
Power	3.7 V normal, 950 mAh Li-Ion
Talk Time (with 950mAh)	Over 200 min (WCDMA, Tx=12 dBm, Voice) Over 180 min (GSM, Max Tx Power, Voice)
Standby Time (with 950mAh)	Over 350 Hrs (WCDMA, DRX=1.28) Over 450 Hrs (GSM, Paging period=9)
Antenna	Internal type
LCD	Main 1.76” TFT, QCIF, 262K
LCD Backlight	White LED Back Light
Camera	1.3 Mega pixel + VGA Video Call Camera
Vibrator	Yes (Cylinder Type)
LED Indicator	No
MIC	Yes
Receiver	Yes
Earphone Jack	Yes (18 pin)
Connectivity	Bluetooth, USB
External Memory	Yes(Micro SD)
I/O Connect	18 Pin

2.2 Usable environment

1) Environment

Item	Specification
Voltage	3.7 V(Typ), 3.2 V(Min), [Shut Down : 3.2 V]
Operation Temp	-20 ~ +60°C
Storage Temp	-20 ~ +70°C
Humidity	85 % (Max)

2) Environment (Accessory)

Reference	Spec.	Min	Typ.	Max	Unit
TA Power	Available power	100	220	240	Vac

* CLA : 12 ~ 24 V(DC)

2.3 Radio Performance

1) Transmitter - GSM Mode

No	Item		GSM		DCS & PCS	
1	Conducted Spurious Emission	MS allocated Channel	100k~1GHz	-39dBm	9k ~ 1GHz	-39dBm
					1G~[A]MHz	-33dBm
			1G~12.75GHz	-33dBm	[A]M~[B]MHz	-39dBm
					[B]M~12.75GHz	-33dBm
		Idle Mode	100k~880MHz	-60dBm	100k~880MHz	-60dBm
			880M~915MHz	-62dBm	880M~915MHz	-62dBm
			915M~1GHz	-60dBm	915M~1GHz	-60dBm
			1G~[A]MHz	-50dBm	1G~[A]MHz	-50dBm
			[A]M~[B]MHz	-56dBm	[A]M~[B]MHz	-56dBm
			[B]M~12.5GHz	-50dBm	[B]M~12.5GHz	-50dBm

* In case of DCS : [A] -> 1710, [B] -> 1785

* In case of PCS : [A] -> 1850, [B] -> 1910

No	Item		GSM		DCS & PCS	
2	Radiated Spurious Emission	MS allocated Channel	30M ~ 1GHz	-36dBm	30M~1GHz	-36dBm
					1G~[A]MHz	-30dBm
			1G ~ 4GHz	-30dBm	[A]M~[B]MHz	-36dBm
					[B]M~4GHz	-30dBm
		Idle Mode	30M ~ 880MHz	-57dBm	30M~880MHz	-57dBm
			880M ~ 915MHz	-59dBm	880M~915MHz	-59dBm
			915M~1GHz	-57dBm	915M~1GHz	-57dBm
			1G~[A]MHz	-47dBm	1G~[A]MHz	-47dBm
			[A]M~[B]MHz	-53dBm	[A]M~[B]MHz	-53dBm
			[B]M~4GHz	-47dBm	[B]M~4GHz	-47dBm
3	Frequency Error		±0.1ppm		±0.1ppm	
4	Phase Error		±5(RMS)		±5(RMS)	
			±20(PEAK)		±20(PEAK)	
5	Frequency Error Under Multipath and Interference Condition		3dB below reference sensitivity		3dB below reference sensitivity	
			RA250 : ±200Hz		RA250: ±250Hz	
			HT100 : ±100Hz		HT100: ±250Hz	
			TU50 : ±100Hz		TU50: ±150Hz	
			TU3 : ±150Hz		TU1.5: ±200Hz	
6	Output RF Spectrum	Due to modulation	0 ~ 100kHz	+0.5dB	0 ~ 100kHz	+0.5dB
			200kHz	-30dB	200kHz	-30dB
			250kHz	-33dB	250kHz	-33dB
			400kHz	-60dB	400kHz	-60dB
			600 ~ 1800kHz	-66dB	600 ~ 1800kHz	-60dB
			1800 ~ 3000kHz	-69dB	1800 ~ 6000kHz	-65dB
			3000 ~ 6000kHz	-71dB	≥6000kHz	-73dB
			≥6000kHz	-77dB		
		Due to Switching transient	400kHz	-19dB	400kHz	-22dB
			600kHz	-21dB	600kHz	-24dB
			1200kHz	-21dB	1200kHz	-24dB
			1800kHz	-24dB	1800kHz	-27dB

*** In case of DCS : [A] -> 1710, [B] -> 1785** *** In case of PCS : [A] -> 1850, [B] -> 1910**

2. PERFORMANCE

No	Item	GSM			DCS & PCS		
7	Intermodulation attenuation		–		Frequency offset		800kHz
					Intermodulation product should be Less than 55dB below the level of Wanted signal		
8	Transmitter Output Power	Power control Level	Power (dBm)	Tolerance (dB)	Power control Level	Power (dBm)	Tolerance (dB)
		5	33	±3	0	30	±3
		6	31	±3	1	28	±3
		7	29	±3	2	26	±3
		8	27	±3	3	24	±3
		9	25	±3	4	22	±3
		10	23	±3	5	20	±3
		11	21	±3	6	18	±3
		12	19	±3	7	16	±3
		13	17	±3	8	14	±3
		14	15	±3	9	12	±4
		15	13	±3	10	10	±4
		16	11	±5	11	8	±4
		17	9	±5	12	6	±4
		18	7	±5	13	4	±4
		19	5	±5	14	2	±5
					15	0	±5
9	Burst timing	Mask IN			Mask IN		

2) Transmitter - WCDMA Mode

No	Item	Specification
1	Maximum Output Power	Class 3 : +24dBm(+1/-3dB)
2	Frequency Error	±0.1ppm
3	Open Loop Power control in uplink	±9dB@normal, ±12dB@extreme
4	Inner Loop Power control in uplink	Adjust output(TPC command)
		cmd 1dB 2dB 3dB
		+1 +0.5/1.5 +1/3 +1.5/4.5
		0 -0.5/+0.5 -0.5/+0.5 -0.5/+0.5
		-1 -0.5/-1.5 -1/-3 -1.5/-4.5
		Group (10 equel command group)
		+1 +8/+12 +16/+24
5	Minimum Output Power	-50dBm(3.84MHz)
6	Out-of-synchronization handling of output power	Qin/Qout : PCCH quality levels Toff@DPCCH/Ior : -22 -> -28dB Ton@DPCCH/Ior : -24 -> -18dB
7	Transmit OFF Power	-56dBm(3.84MHz)
8	Transmit ON/OFF Time Mask	±25us PRACH,CPCH,uplinlk compressed mode
9	Change of TFC	±25us Power varies according to the data rate DTX : DPCH off (minimize interference between UE)
10	Power setting in uplink compressed	±3dB(after 14slots transmission gap)
11	Occupied Bandwidth(OBW)	5MHz(99%)
12	Spectrum emission Mask	-35-15*(Δf-2.5)dBc@Δf=2.5~3.5MHz,30k -35-1*(Δf-3.5)dBc@Δf=3.5~7.5MHz,1M -39-10*(Δf-7.5)dBc@Δf=7.5~8.5MHz,1M -49dBc@Δf=8.5~12.5MHz,1M

No	Item	Specification
13	Adjacent Channel Leakage Ratio(ACLR)	33dB@5MHz, ACP>-50dBm 43dB@10MHz, ACP>-50dBm
14	Spurious Emissions (*: additional requirement)	-36dBm@f=9~150KHz, 1K BW -36dBm@f=50KHz~30MHz, 10K BW -36dBm@f=30MHz~1000MHz, 100K BW -30dBm@f=1~12.5GHz, 1M BW (*)-41dBm@f=1893.5~1919.6MHz, 300K (*)-67dBm@f=925~935MHz, 100K BW (*)-79dBm@f=935~960MHz, 100K BW (*)-71dBm@f=1805~1880MHz, 100K BW
15	Transmit Intermodulation	-31dBc@5MHz,Interferer -40dBc -41dBc@10MHz, Interferer -40dBc
16	Error Vector Magnitude (EVM)	17.5%(>-20dBm) (@12.2K, 1DPDCH+1DPCCH)
17	Transmit OFF Power	-15dB@SF=4.768Kbps, Multi-code transmission

3)Receiver - GSM Mode

No	Item		GSM	DCS & PCS
1	Sensitivity (TCH/FS Class II)		-105dBm	-105dBm
2	Co-Channel Rejection (TCH/FS Class II, RBER, TU high/FH)		C/Ic=7dB	Storage -30 ~ +85
3	Adjacent Channel Rejection	200kHz	C/Ia1=-12dB	C/Ia1=-12dB
		400kHz	C/Ia2=-44dB	C/Ia2=-44dB
4	Intermodulation Rejection		Wanted Signal :-98dBm 1st interferer:-44dBm 2nd interferer:-45dBm	Wanted Signal :-96dBm 1st interferer:-44dBm 2nd interferer:-44dBm
5	Blocking Response (TCH/FS Class II, RBER)		Wanted Signal :-101dBm Unwanted : Depend on Frequency	Wanted Signal :-101dBm Unwanted : Depend on Frequency

4) Receiver - WCDMA Mode

No	Item	Specification
1	Reference Sensitivity Level	-106.7 dBm(3.84 MHz)
2	Maximum Input Level	-25dBm(3.84MHz) -44dBm/3.84MHz(DPCH_Ec) UE@+20dBm output power(Class3)
3	Adjacent Channel Selectivity (ACS)	33dB UE@+20dBm output power(Class3)
4	In-band Blocking	-56dBm/3.84MHz@10MHz UE@+20dBm output power(Class3)
		-44dBm/3.84MHz@15MHz UE@+20dBm output power(Class3)
5	Out-band Blocking	-44dBm/3.84MHz@f=2050~2095 and 2185~2230MHz UE@+20dBm output power(Class3)
		-30dBm/3.84MHz@f=2025~2050 and 2230~2255MHz UE@+20dBm output power(Class3)
		-15dBm/3.84MHz@f=1~2025 and 2255~12500MHz UE@+20dBm output power(Class3)
6	Spurious Response	-44dBm CW UE@+20dBm output power(Class3)
7	Intermodulation Characteristic	-46dBm CW@10MHz -46dBm/3.84MHz@20MHz UE@+20dBm output power(Class3)
8	Spurious Emissions	-57dBm@f=9KHz~1GHz, 100K BW -47dBm@f=1~12.5GHz, 1M BW -60dBm@f=1920MHz~1980MHz, 3.84M BW -60dBm@f=2110MHz~2170MHz, 3.84M BW

2.4 Current Consumption

1) U250/KU250 Current Consumption

	Stand by	Voice Call	VT
WCDMA	Under 2.80 mA (DRX=1.28)	Under 290 mA (Tx=12dBm)	Under 410mA (Tx=12dBm)
GSM	Under 2.12 mA Paging=9 period	Under 320 mA (Max Tx Power)	

(Stand by and Voice Call Test Condition : Bluetooth off, LCD backlight off,Neighbor Cell off) (VT Test Condition : Speaker off, LCD backlight On)

2.5 RSSI BAR

Level Change	WCDMA	GSM
BAR 4 → 3	-85 ± 2 dBm	-90 ± 2 dBm
BAR 3 → 2	-95 ± 2 dBm	-95 ± 2 dBm
BAR 2 → 1	-106 ± 2 dBm	-100 ± 2 dBm
BAR 1 → 0	-111 ± 2 dBm	-106 ± 2 dBm

2.6 Battery BAR

Indication	Standby
Bar 4	Over 3.83 ± 0.05V
Bar 4 → 3	3.82 ± 0.05V
Bar 3 → 2	3.73 ± 0.05V
Bar 2 → 1	3.68 ± 0.05V
Bar 1 → Empty	3.58 ± 0.05V
Low Voltage, Warning message+ Blinking	3.58± 0.05V (Stand-by) / 3.58 ± 0.05V (Talk) [Interval : 3min(Stand-by) / 1min(Talk)]
Power Off	3.20 ± 0.05V

2.7 Sound Pressure Level

No	Test Item		Specification	
1	Sending Loudness Rating (SLR)	MS	8 ±3 dB	
2	Receiving Loudness Rating (RLR)	MS	Nor	-4 ± 3 dB
			Max	-15 ± 3 dB
3	Side Tone Masking Rating (STMR)	MS	Min	17 dB
4	Echo Loss (EL)	MS	Min	40 dB
5	Idle Noise-Sending (INS)	MS	Max	-64 dBm0p
6	Idle Noise-Receiving (INR)	MS	Nor	Under -47 dBPA
			Max	Under -36 dBPA
7	Sending Loudness Rating (SLR)	Headset	8±3dB	
8	Receiving Loudness Rating (RLR)	Headset	Nor	-1 ±3 dB
			Max	-12 ±3 dB
9	Side Tone Masking Rating (STMR)	Headset	Min	25 dB
10	Echo Loss (EL)	Headset	Min	40 dB
11	Idle Noise-Sending (INS)	Headset	Max	-55 dBm0p
12	Idle Noise-Receiving (INR)	Headset	Nor	Under -45 dBPA
			Max	Under -40 dBPA
13	TDMA Noise -. GSM : Power Level : 5 DCS/PCS : Power Level : 0 (Cell Power : -90 ~ -105 dBm) -. Acoustic (Max Vol.) MS/Headset SLR : 8 ± 3dB MS/Headset RLR : -15 ± 3dB/-12 (SLR/RLR : Mid-value setting)	MS and Headset	Max	Under -62 dBm

2.8 Charging

- **Charging Method :** CC & CV (Constant Current and Constant Voltage)
- **Maximum Charging Voltage :** 4.2 V
- **Maximum Charging Current :** 700 mA
- **Normal Battery Capacity :** 950 mAh
- **Charging Time :** Max 3 hours (except for trickle charging time)
- **Full charging indication current (charging icon stop current) :** 80 mA
- **Cut-off voltage :** 3.20 V

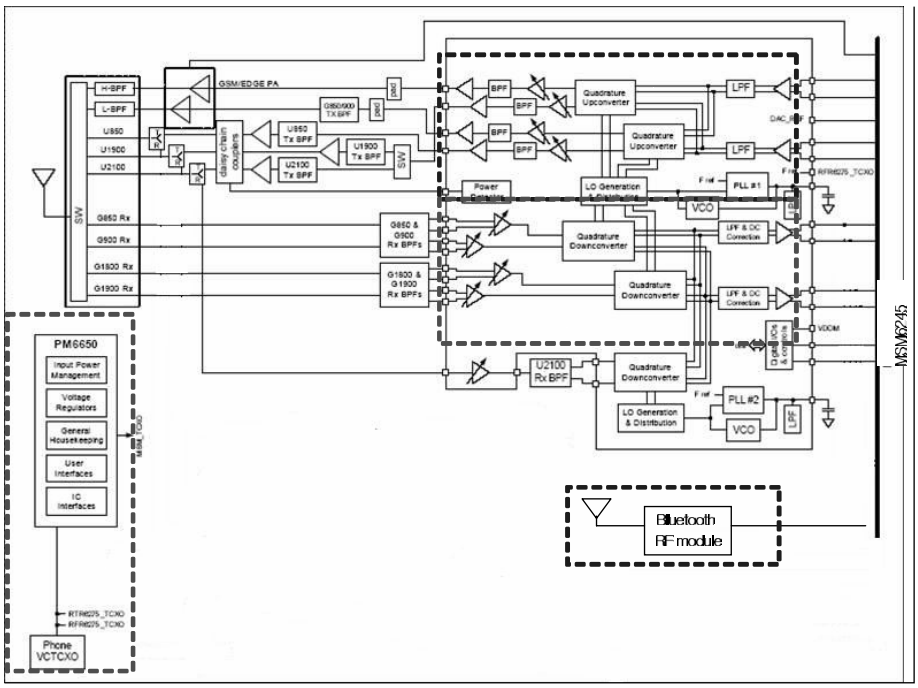
3. TECHNICAL BRIEF

3.1 General Description

The U250/KU250 supports UMTS-2100, GSM-900, DCS-1800, and PCS-1900 based GSM/GPRS/UMTS. All receivers and the UMTS transmitter use the radio One[1]Zero-IF architecture to eliminate intermediate frequencies, directly converting signals between RF and baseband. The quad-band GSM transmitters use a baseband-to-IF upconversion followed by an offset phase-locked loop that translates the GMSK-modulated signal to RF.

UMTS (2100)
GSM (900, 1800, 1900)
Bluetooth

1. RTR6275 for GSM Tx and WCDMA Tx
2. RTR6275 for GSM Rx and WCDMA Rx
3. Bluetooth RF module
4. PM6650 for power management



[Fig 1.1] Block diagram of RF part

[1] QUALCOMM's branded chipset that implements a Zero-IF radio architecture.

3. TECHNICAL BRIEF

A generic, high-level functional block diagram of U250/KU250 is shown in Figure 1-1. One antenna collects base station forward link signals and radiates handset reverse link signals. The antenna connects with receive and transmit paths through a FEM(Front End Module).

The UMTS receive path each include a LNA, a RF band-pass filter, and a downconverter that translate the signal directly from RF-to-baseband using radioOne ZIF technique. The RFIC Rx analog baseband outputs, for the receive chains, connect to the MSM IC. The UMTS and GSM Rx baseband outputs share the same inputs to the MSM IC.

For the transmit chains, the RTR6275 IC directly translates the Tx baseband signals (from the MSM device) to an RF signal using an internal LO generated by integrated on-chip PLL and VCO. The RTR6275 IC outputs deliver fairly high-level RF signals that are first filtered by Tx SAWs and then amplified by their respective UMTS PA. The high- and low-band UMTS RF transmit signals emerge from the RTR6275 transceiver.

In the GSM receive paths, the received RF signals are applied through their band-pass filters and down-converted directly to baseband in the RTR6275 transceiver IC. These baseband outputs are shared with the UMTS receiver and routed to the MSM IC for further signal processing.

The GSM transmit paths employ one stage of up-conversion and, in order to improve efficiency.

1. The on-chip quadrature up-converter translates the GMSK-modulated signal to a constant envelope phase signal at RF;
2. The amplitude-modulated (AM) component is applied to the ramping control pin of power amplifier from a DAC within the MSM

U250/KU250 power supply voltages are managed and regulated by the PM6650 Power Management IC. This versatile device integrates all wireless handset power management, general housekeeping, and user interface support functions into a single mixed signal IC. It monitors and controls the external power source and coordinates battery recharging while maintaining the handset supply voltages using low dropout, programmable regulators.

The device's general housekeeping functions include an ADC and analog multiplexer circuit for monitoring on-chip voltage sources, charging status, and current flow, as well as userdefined off-chip variables such as temperature, RF output power, and battery ID. Various oscillator, clock, and counter circuits support IC and higher-level handset functions. Key parameters such as under-voltage lockout and crystal oscillator signal presence are monitored to protect against detrimental conditions.

3.2 GSM Mode

3.2.1 GSM Receiver

The Dual-mode U250/KU250's receiver functions are split among the three RFIC's as follows:

- GSM-900, DCS-1800, and PCS-1900 UMTS-2100 modes use the RTR6275 IC only. Each mode has independent front-end circuits and down-converters, but they share common baseband circuits (with only one mode active at a time). All receiver control functions are beginning with SBI[2]-controlled parameters.

RF Front end consists of antenna, antenna switch module(D5011) which includes three RX saw filters(GSM900, DCS and PCS). The antenna switch module allows multiple operating bands and modes to share the same antenna. In U250/KU250, a common antenna connects to one of six paths: 1) UMTS-2100 Rx/Tx, 2) GSM-900 Rx, 3) GSM-900 Tx, 4) DCS-1800 Rx, and 5) DCS-1800 Tx, PCS-1900 Tx(High Band Tx's share the same path), 6) PCS-1900 Rx. UMTS operation requires simultaneous reception and transmission, so the UMTS Rx/Tx connection is routed to a duplexer that separates receive and transmit signals. The GSM900, DCS, and PCS operation is time division duplexed, so only the receiver or transmitter is active at any time and a frequency duplexer is not required.

	ANT_SEL0	ANT_SEL1
GSM 1800 / GSM1900 RX	LOW	LOW
GSM 900 RX	HIGH	LOW
GSM 900 TX / WCDMA	LOW	HIGH
GSM 1800 / GSM 1900 TX	HIGH	HIGH

[Table 1.1] Antenna Switch Module Control logic

[2] The RFIC operating modes and circuit parameters are MSM-controlled through the proprietary 3-line Serial Bus Interface (SBI). The Application Programming Interface (API) is used to implement SBI commands. The API is documented in AMSS Software - please see applicable AMSS Software documentation for details.

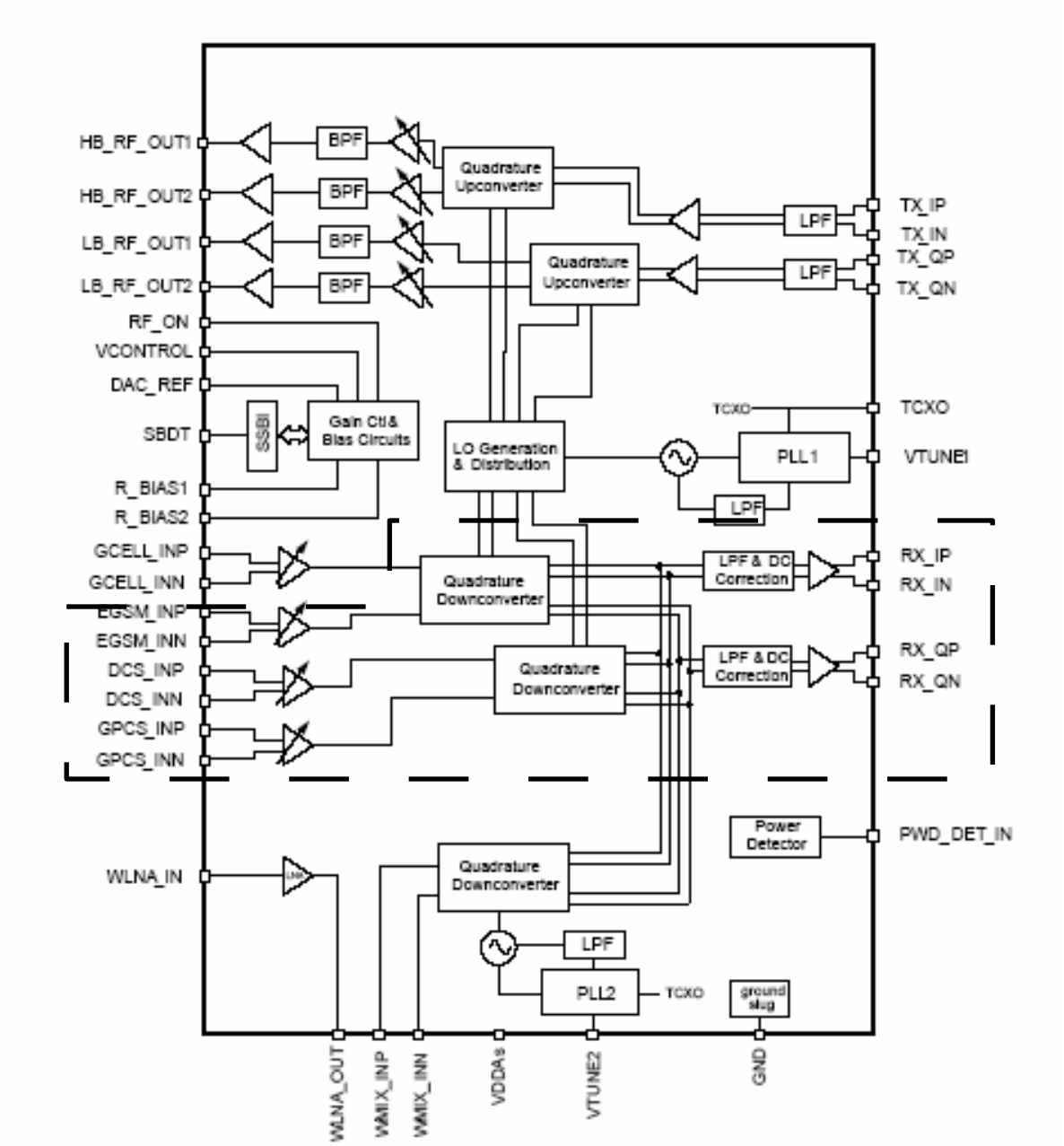
3. TECHNICAL BRIEF

The GSM900, DCS, and PCS receiver inputs of RTR6275 are connected directly to the transceiver front-end circuits(filters and antenna switch module). The GSM900, DCS, and PCS receiver inputs use differential configurations to improve common-mode rejection and second-order non-linearity performance. The balance between the complementary signals is critical and must be maintained from the RF filter outputs all the way into the IC pins

Since GSM900, DCS, and PCS signals are time-division duplex (the handset can only receive or transmit at one time), switches are used to separate Rx and Tx signals in place of frequency duplexers - this is accomplished in the switch module.

The GSM900, DCS, and PCS receive signals are routed to the RTR6275 through band selection filters and matching networks that transform single-ended 50-Ω sources to differential impedances optimized for gain and noise figure. The RTR input uses a differential configuration to improve second-order inter-modulation and common mode rejection performance. The RTR6275 input stages include MSM-controlled gain adjustments that maximize receiver dynamic range.

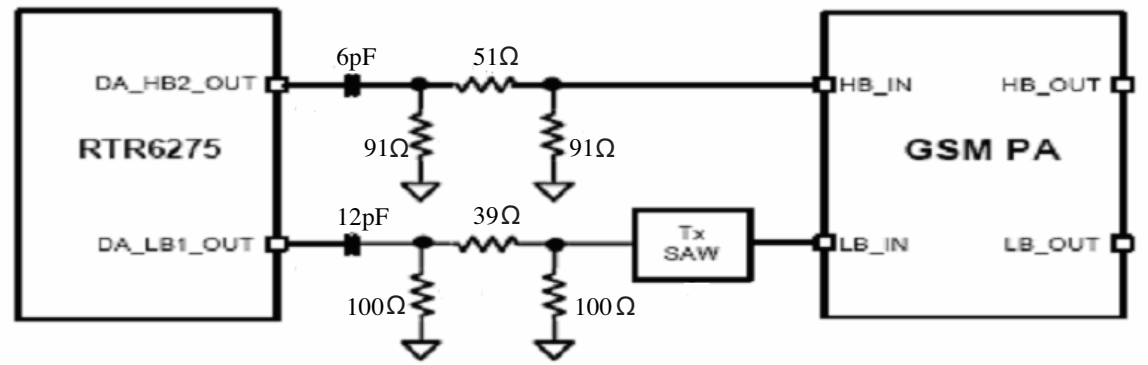
The amplifier outputs drive the RF ports of the quadrature RF-to-baseband downconverters.
The downconverted baseband outputs are multiplexed and routed to lowpass filters (one I and one Q) having passband and stopband characteristics suitable for GMSK processing. These filter circuits include DC offset corrections. The filter outputs are buffered and passed on to the MSM6245 IC for further processing (an interface shared with the RFR6275 UMTS receiver outputs).



[Fig 1.2] RTR6275 RX feature

3.2.2 GSM Transmitter

The RTR6275 transmitter outputs(DA_HB2_OUT and DA_LB1_OUT)include on-chip output matching inductors. The 50ohm output impedance is achieved by adding a series capacitor at the output pins. The capacitor value may be optimized for specific applications and PCB characteristics based on pass-band symmetry about the band center frequency, the suggested starting value is shown in Figure1.3.



[Fig 1.3] GSM Transmitter matching

The RTR6275 IC is able to support GSM 900 and GSM 1800/1900 mode transmitting. This design guideline shows a tri-band GSM application.

Both high-band and low band outputs are followed by resistive pads to ensure that the load presented to the outputs remains close to 50ohm. The low-band GSM Tx path also includes a Tx-band SAW filter to remove noise-spurious components and noise that would be amplified by the PA and appear in the GSM Rx band

3.3 UMTS Mode

3.3.1 Receiver

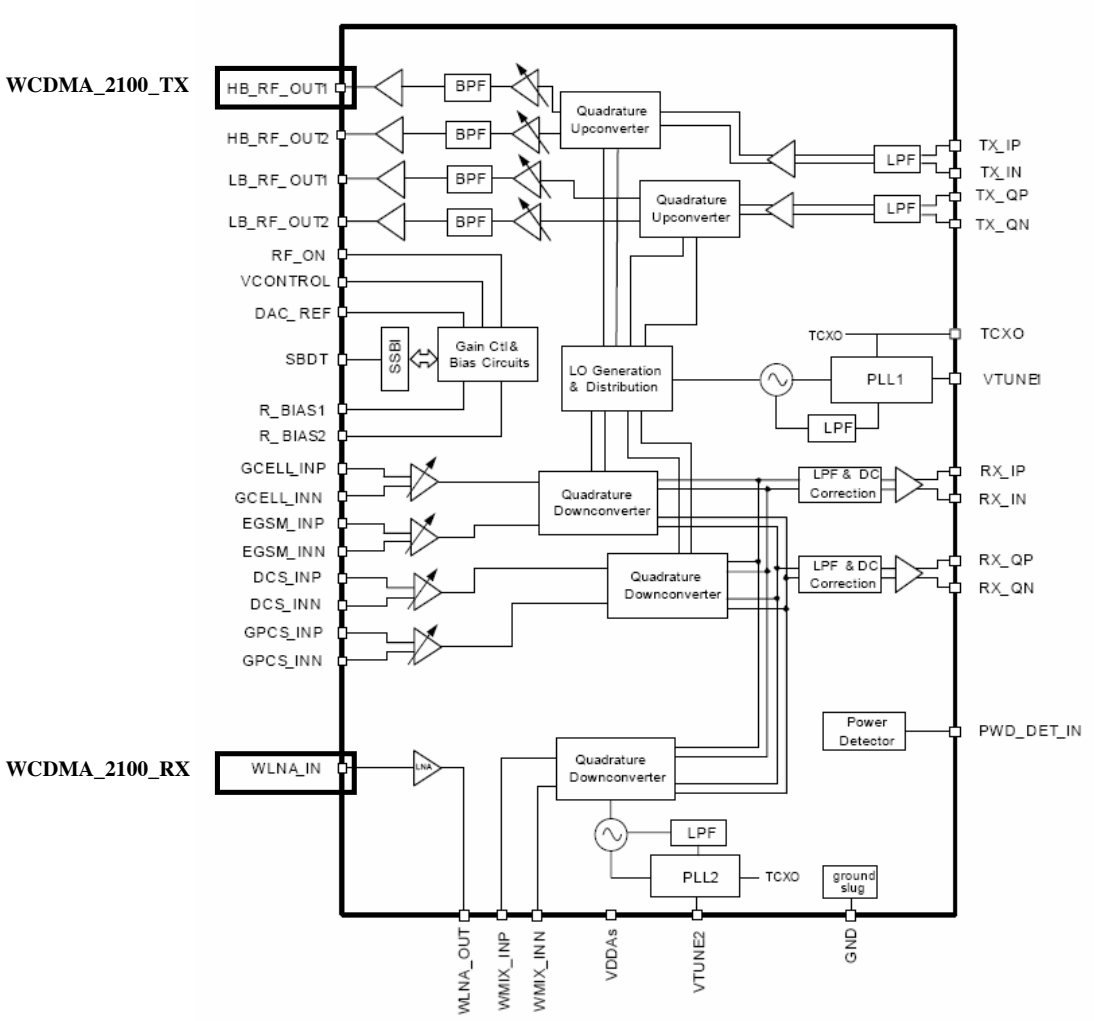
The UMTS duplexer receiver output is routed to LNA circuits within the RTR6275 device. The UMTS Rx input is provided with an on-chip LNA that amplifies the signal before a second stage filter that provides differential downconverter. This second stage input is configured differentially to optimize second-order intermodulation and common mode rejection performance. The gain of the UMTS frontend amplifier and the UMTS second stage differential amplifier are adjustable, under MSM control, to extend the dynamic range of the receivers. The second stage UMTS Rx amplifiers drive the RF ports of the quadrature RF-tobaseband downconverters. The downconverted UMTS Rx baseband outputs are routed to lowpass filters having passband and stopband characteristics suitable for UMTS Rx processing. These filter circuits allow DC offset corrections, and their differential outputs are buffered to interface shared with GSM Rx to the MSM IC. The UMTS baseband outputs are turned off when the RTR6275 is downconverting GSM signals and on when the UMTS is operating.

3.3.2 Transmitter

The UMTS Tx path begins with differential baseband signals (I and Q) from the MSM device. These analog input signals are amplified, filtered, and applied to the quadrature up-converter mixers. The up-converter output is amplified by multiple variable gain stages that provide transmit AGC control. The AGC output is filtered and applied to the driver amplifier; this output stage includes an integrated matching inductor that simplifies the external matching network to a single series capacitor to achieve the desired 50-Ω interface.

The RTR6275 UMTS output is routed to its power amplifier through a bandpass filter, and delivers fairly high-level signals that are filtered and applied to the PA. Transmit power is delivered from the duplexer to the antenna through the switch module. The transceiver LO synthesizer is contained within the RTR6275 IC with the exception of the off-chip loop filter components and the VC-TCXO. This provides a simplified design for multimode applications. The PLL circuits include a reference divider, phase detector, charge pump, feedback divider, and digital logic generator.

UMTS Tx using PLL1, the LO generation and distribution circuits create the necessary LO signals for different frequency converters. The UMTS transmitter also employs the ZIF architecture to translate the signal directly from baseband to RF. This requires F_{LO} to equal F_{RF}, and the RTR6275 IC design achieves this without allowing F_{VCO} to equal F_{RF}.
The RTR6275 IC is able to support UMTS 2100/1900 and UMTS 850 mode transmitting. This design guideline shows only UMTS 2100 applications.



[Figure 1.4] RTR6275 IC functional block diagram

3.4 LO generation and distribution circuits

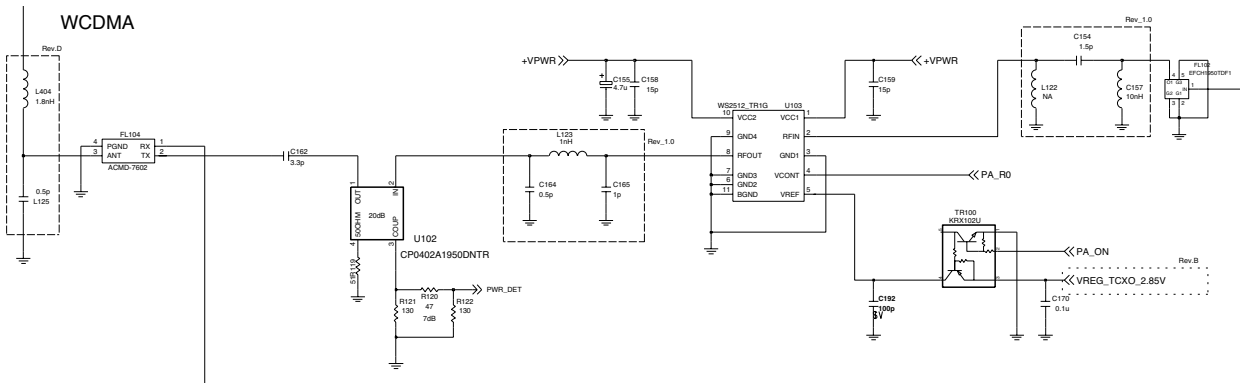
The integrated LO generation and distribution circuits are driven by internal VCOs to support various modes to yield highly flexible quadrature LO outputs that drive all GSM and UMTS band upconverters and downconverters; with the help of these LO generation and distribution circuits, zero-IF architecture is employed in all GSM and UMTS band receivers and transmitters to translate the signal directly from RF to baseband and from baseband to RF.

Two fully functional fractional-N synthesizers, including VCOs and loop filters, are integrated within the RTR6275 IC. The first synthesizer (PLL1) creates the transceiver LOs that support the UMTS 2100/1900/1800 transmitter, and all four GSM band receivers and transmitters including: GSM 850, GSM 900, GSM 1800, and GSM 1900. The second synthesizer (PLL2) provides the LO for the UMTS 2100/1900/1800 receiver. An external TCXO input signal is required to provide the synthesizer frequency reference to which the PLL is phase and frequency locked. The RTR6275 IC integrates most of PLL loop filter components on-chip except two off-chip loop filter series capacitors, and significantly reduces off-chip component requirement. With the integrated fractional-N PLL synthesizers, the RTR6275 has the advantages of more flexible loop bandwidth control, fast lock time, and low-integrated phase error

3.5 Off-chip RF Components

3.5.1 WCDMA PAM (U103: WS2512-TR1G)

The UMTS PA output power is monitored by I power detector circuits(U100 : RTR6275) .
This detector voltage can be used for transmitter calibration and monitor to meet RF system



[Figure 1.5] WCDMA PAM, Duplexer, Coupler

3.5.2 VCTCXO (X100 : DSA321SCE-19.2M)

The Voltage Controlled Temperature Compensated Crystal Oscillator (VCTCXO) provides the reference frequency for all RFIC synthesizers as well as clock generation functions within the MSM6245 IC. The oscillator frequency is controlled by the MSM6245 IC.
TRK_LO_ADJ pulse density modulated signal in the same manner as the transmit gain control TX_AGC_ADJ. A two-pole RC lowpass filter is recommended on this control line.

The PM6650 IC controls the handset power-up sequence, including a special VCTCXO warm-up interval before other circuits are turned on. This warm-up interval (as well as other TCXO controller functions) is enabled by the MSM TCXO_EN line . The PM6650 IC VREG_TCXO regulated output voltage is used to power the VCTCXO and is enabled before most other regulated outputs.
Any GSM mode power control circuits within the MSM6245 IC require a reference voltage for proper operation and sufficient accuracy. Connecting the PM6650 IC REF_OUT directly to the MSM6245 IC GSM_PA_PWR_CTL_REF provides this reference. This sensitive analog signal needs a 0.1 •ÏF low frequency filter near to MSM side, and isolate from digital logic and clock traces with ground on both sides, plus ground above and below if routed on internal layers.

3.5.3 Front-End Module (U500 : D5011)

This equipment uses a single antenna to support all handset operating modes, with an antenna switch module select the operating frequency and band. UMTS operation requires simultaneous reception and transmission, so the UMTS Rx/Tx connection is routed to a duplexer that separates receive and transmit signals. The active connection is MSM-selected by three control lines (GPIO[9], GPIO[10]). Two GPIO are programmed to be ANT_SEL0_N, ANT_SEL1_N) respectively.

	ANT_SEL0	ANT_SEL1
GSM 1800 / GSM1900 RX	LOW	LOW
GSM 900 RX	HIGH	LOW
GSM 900 TX / WCDMA	LOW	HIGH
GSM 1800 / GSM 1900 TX	HIGH	HIGH

[Table 1.2] Front End Module control logic

3.5.4 PMIC Functional Block Diagram (U300 : PM6650-2M)

• Input power management

- Valid external supply attachment and removal detection
- Supports unregulated (closed-loop) external charger supplies and USB supplies as input power sources
- Supports lithium-ion main batteries
- Trickle, constant current, constant voltage, and pulsed charging of the main battery
- Supports coin cell backup battery (including charging)
- Battery voltage detectors with programmable thresholds
- VDD collapse protection
- Charger current regulation and real-time monitoring for over-current protection
- Charger transistor protection by power limit control
- Control drivers for two external pass transistors and one external battery MOSFET - MOSFET is optional
- Voltage, current, and power control loops
- Automated recovery from sudden momentary power loss

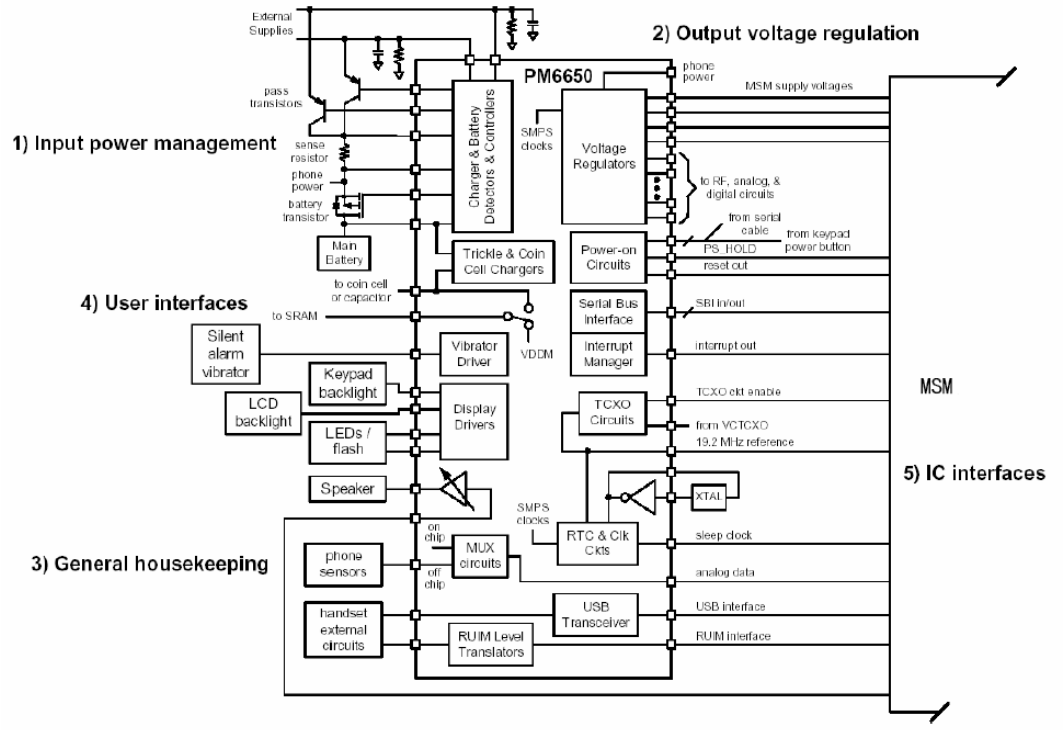
• Output voltage regulation

- One boost (step-up) switched-mode power supply (SMPS) for driving white LEDs and hosting USBOTG
- Three buck (step-down) switched-mode power supplies that efficiently generate MSMC, MSME, and PA (or second MSMC) supply voltages
- Supports dynamic voltage scaling (DVS) for MSMC and PA
- Eleven low dropout regulator circuits with programmable output voltages, implemented using three different current ratings: 300 mA (two), 150 mA (six), and 50 mA (three). These can be used to power MSMA, MSMP, RFRX1, RFRX2, RFTX, SYNT, TCXO, WLAN, MMC, USB, and RUIM circuits.
- All regulators can be individually enabled/disabled for power savings
- Low power mode available on MSMA and MSMP regulators
- All regulated outputs are derived from a common bandgap reference-close tracking

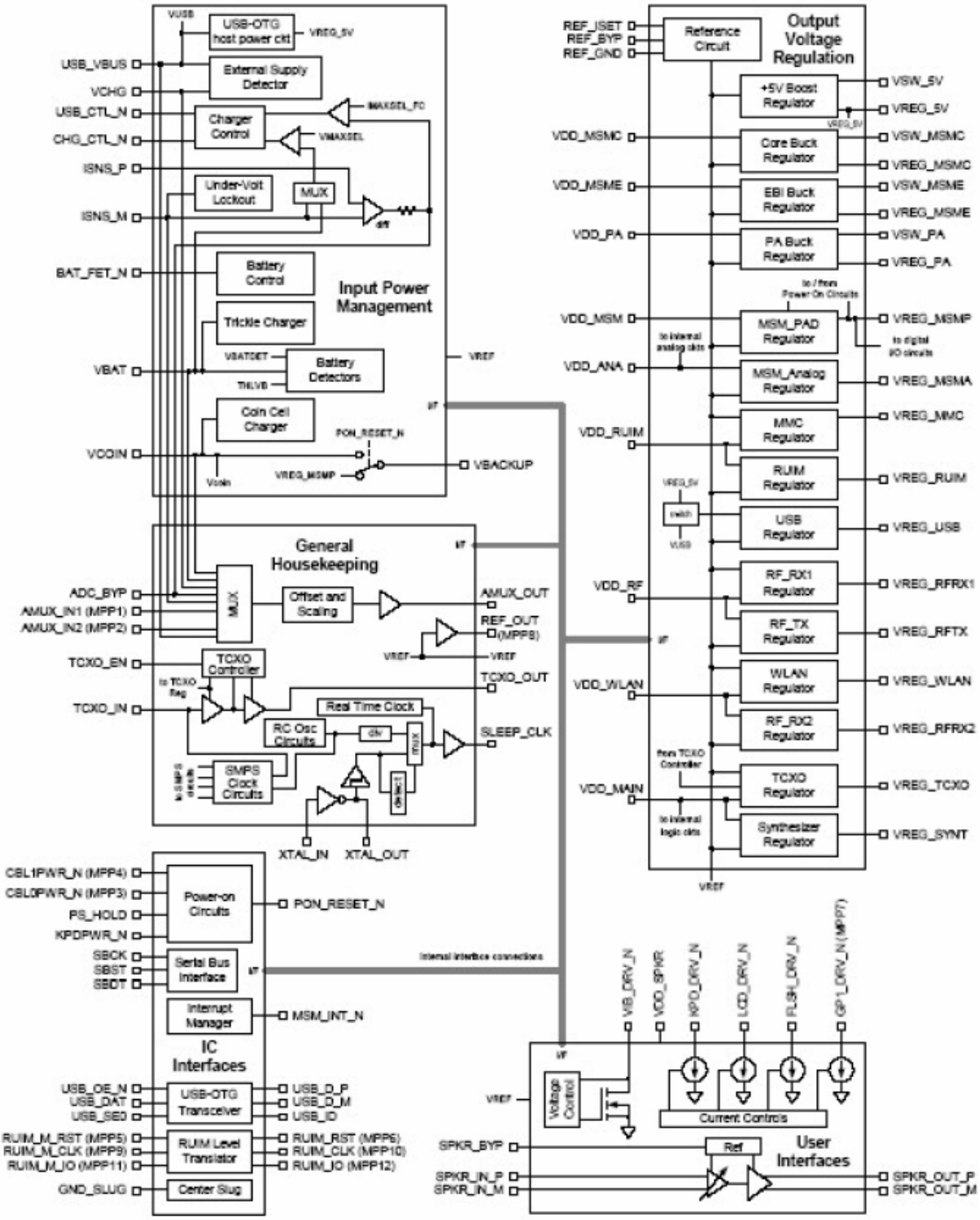
• Integrated handset-level housekeeping functions reduces external parts count, size, cost

- Analog multiplexer selects from 8 internal and up to 18 external inputs
- Multiplexer output's offset and gain are adjusted, increasing the effective ADC resolution
- Adjusted multiplexer output is buffered and routed to an MSM device ADC
- Dual oscillators - 32.768 kHz off-chip crystal and on-chip RC assures MSM device sleep clock
- Crystal oscillator detector and automated switch-over upon lost oscillation
- Real time clock for tracking time and generating associated alarms
- On-chip adjustments minimize crystal oscillator frequency errors
- Circuits control TCXO warm-up and synchronize, deglitch, and buffer the TCXO signal
- TCXO buffer control for optimal QPH/catnap timing
- Three-stage over-temperature protection (smart thermal control)

- Integrated handset-level user interfaces
  - Four programmable current sinks recommended as keypad backlight, LCD backlight, camera flash, and general-purpose drivers
  - Vibration motor driver programmable from 1.2 to 3.1V in 100 mV increments
  - Speaker driver with programmable gain, turn-on time, and muting; differential operation (drives external 8 Ω speakers with volume controlled 500 mW)
- IC-level interfaces
  - MSM device-compatible 3-line SBI for efficient initialization, status, and control
  - Supports the MSM device's interrupt processing with an internal interrupt manager
  - Many functions monitored and reported through real-time and interrupt status signals
  - Dedicated circuits for controlled power-on sequencing, including the MSM device's reset signal
  - Several events continuously monitored for triggering power-on/power-off sequences
  - Supports and orchestrates soft resets
  - USB-OTG transceiver for full-speed (12 Mb/s) and low speed (1.5 Mb/s) interfacing of the MSM device to computers as a USB peripheral, or connecting the MSM device to other peripherals - RUIM level translators enable MSM device interfacing with external modules
- Twelve multi-purpose pins that can be configured as digital or analog I/Os, bi-directional I/Os, or current sinks. Default functions support the RUIM level translators, power-on circuits, analog multiplexer inputs, an LED driver, and a reference voltage buffer.
- Highly integrated functionality in a small package - 84-pin BCCS with a large center slug for electrical ground, mechanical stability, and thermal relief



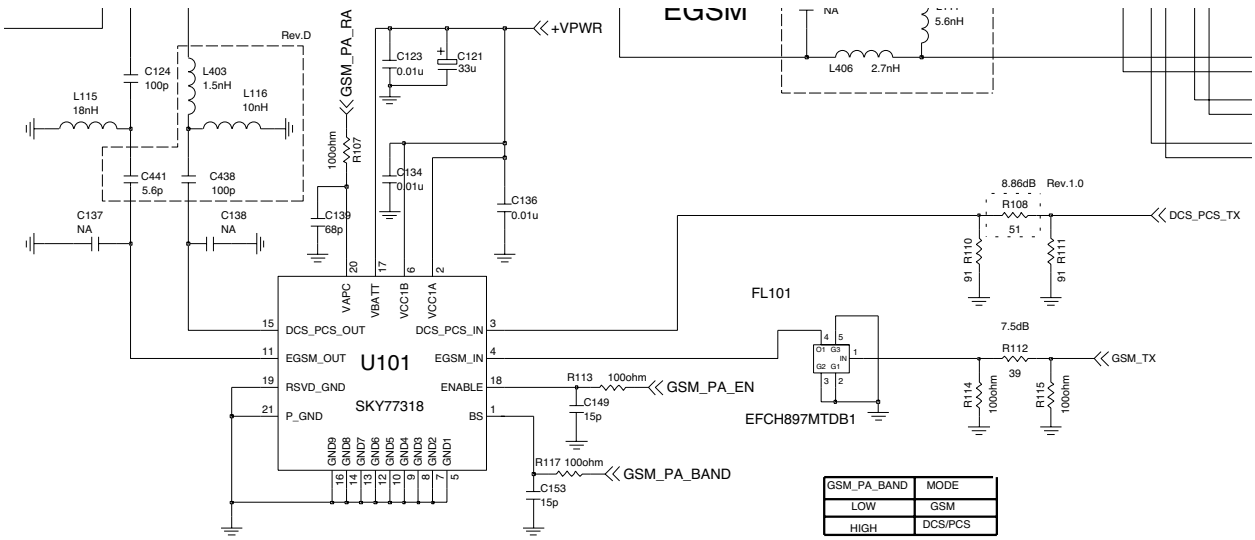
[Figure 1.6] MSM6245 Interface



[Figure1.7] PM6650 Block Diagram

3.5.5 GSM PAM (U101 : SKY77318)

The SKY77318 is an extremely small (6 x 6 mm), GSM PAM for handset applications. This module has been optimized for excellent efficiency and Pout while maintaining high GSM/GPRS efficiency. The small size and high performance is achieved with high-reliability GaAs HBT technology.
With 50Ω and output, no external matching or bias components are required. The module incorporates two highly-integrated GaAs power amplifier die with a BiCMOS controller.
Each amplifier has three gain stages with on-die inter-stage matching implemented with a high Q passives technology for optimal performance. The CMOS controller implements a fully integrated power control within the module for GSM operations, and serves as the GPRS operations. This eliminates the need for any external couplers, power detectors, current sensing etc., to assure the output power level. The module has Tx enable and band select inputs. Module construction is a low-profile overmolded land-grid array on laminate.



[Figure 1. 8] GSM PAM Schematic

3.5.6 UMTS Duplexer(FL104:ACMD-7602)

A UMTS duplexer splits a single operating band into receive and transmit paths. Important performance requirements include;

- Insertion loss. this component is also in the receive and transmit paths ; In the U250/KU250 typical losses : UMTS2100_ Tx = 1.2 dB, UMTS2100_ Rx = 1.4 dB
- Out-of-band rejection or attenuation. the duplexer provides input selectivity for the receiver, output filtering for the transmitter, and isolation between the two. Rejection levels for both paths are specified over a number of frequency ranges. Two Tx-to-Rx isolation levels are critical to receiver performance:
- Rx-band isolation. the transmitter is specified for out-of-band noise falling into the Rx band. This noise leaks from the transmit path into the receive path, and must be limited to avoid degrading receiver sensitivity. The required Rx-band isolation depends on the PA out of-band noise levels and Rx-band losses between the PA and LNA. Minimum duplexer Rx band isolation value is about 51 dB.
- Tx-band isolation. the transmit channel power also leaks into the receiver. In this case, the leakage is outside the receiver passband but at a relatively high level. It combines with Rx band jammers to create cross-modulation products that fall in-band to desensitize the receiver. The required Tx-band isolation depends on the PA channel power and Tx-band losses between the PA and LNA. Minimum duplexer Tx-band isolation value is about 58dB.
- Passband ripple. the loss of this fairly narrowband device is not flat across its passband. Passband ripple increases the receive or transmit insertion loss at specific frequencies, creating performance variations across the band.s channels, and should be controlled.
- Return loss. minimize mismatch losses with typical return losses of 10 dB or more (VSWR <2:1).
- Power handling. high power levels in the transmit path must be accommodated without degraded performance. The specified level depends on the operating band class and mobile station class (per the applicable standard), as well as circuit losses and antenna EIRP. Several duplexer characteristics depend upon its source and load impedances. QUALCOMM strongly recommends an isolator be used between the UMTS PA and duplexer to assure proper performance.

3.5.7 UMTS Rx RF filter (FL103 : EFCH2140TDE1)

• Frequency range : 2110 ~ 2170MHz

An RF filter is located between the UMTS LNA and mixer. Insertion loss is important, but not as critical as losses before the LNA. The most important parameters of this component include:

• Out-of-band rejection or attenuation levels, usually specified to meet these conditions:

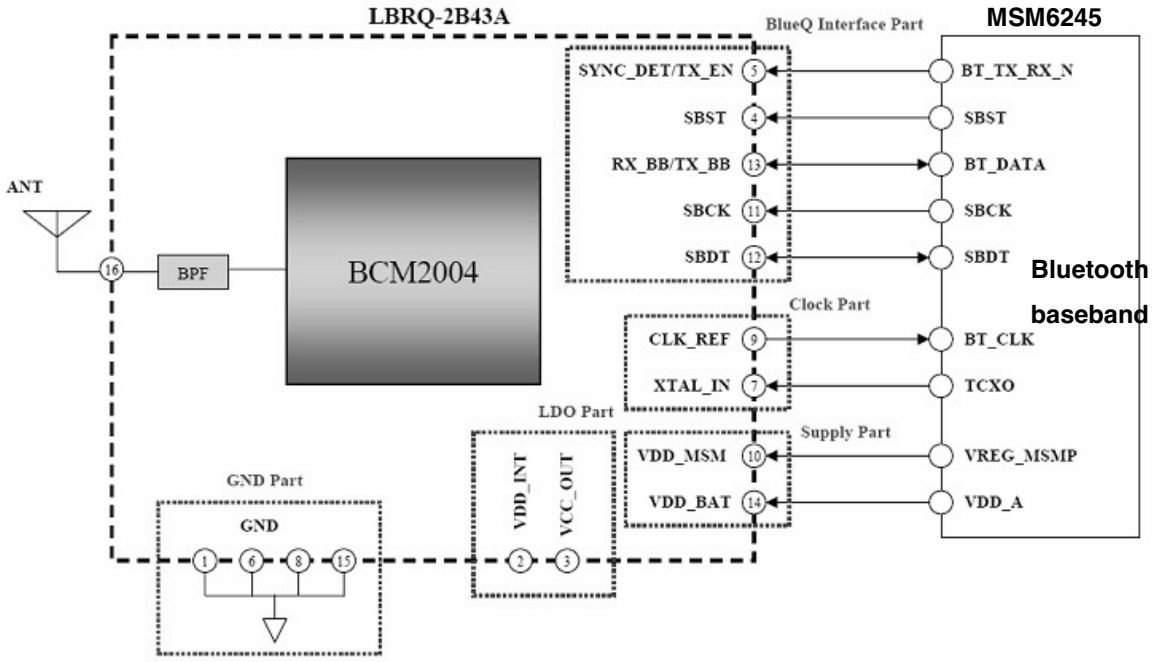
- FFar out-of-band signals - ranging from DC up to the first band of particular concern and from the last band of particular concern to beyond three times the highest passband frequency.
- Tx-band leakage - the transmitter channel power, although attenuated by the duplexer, still presents a cross-modulation threat in combination with Rx-band jammers. The RF filter must provide rejection of this Tx-band leakage.
- Other frequencies of particular concern . bands known to include other wireless transmitters that may deliver significant power levels to the receiver input.

Parameter		Frequency	Our Preliminary spec. D/N: T2140F3A			Unit
			Min.	Typ.	Max.	
Passband			2110 ... 2170			MHz
Insertion loss		2110 ... 2170MHz		1.5	2.0	dB
Ripple in passband		2110 ... 2170MHz		0.5	1.2	dB
Amplitude imbalance		2110 ... 2170MHz	-1.5	-1.11 +0.73	+1.5	dB
Phase imbalance		2110 ... 2170MHz	-10.0	-1.92 +1.02	+10.0	deg.
Attenuation	Att1	0.1 ... 1980MHz	40	43		dB
	Att2	1980 ... 2040MHz	30	34		dB
	Att3	2250 ... 3000MHz	18	25		dB
	Att4	3000 ... 6000MHz	25	40		dB
VSWR	Input	2110 ... 2170MHz		1.5	2.0	
	Output	2110 ... 2170MHz		1.5	2.0	
Input impedance (Single Ended)			50			Ohm
Output impedance (Differential)			100 // 10nH			Ohm
Maximum drive level		1920 ... 1980MHz			+10	mW
DC Input level					+3	V
Operating temperature			-25		+85	deg. C
Storage temperature			-30		+85	deg. C

Table 1.3 WCDMA Rx SAW Filter Specification

3.5.8 Bluetooth (M100 : LBRQ-2B43A)

The MSM6245 includes BT baseband embedded BT 1.1 compliant baseband core, so the other bluetooth components are an bluetooth RF module and Antenna. Figure1.9 shows the bluetooth system architecture in the U250/KU250.



[Figure1.9] Bluetooth system architecture

3. BB Technical Description

3.6 Digital Baseband(DBB/MSM6245)

3.6.1 General Description

A. Features(MSM6245)

- Support for multimode operation - tri-band WCDMA (UMTS), quad-band GSM/GPRS/EDGE
- Support for WCDMA (UMTS) uplink data rate up to 384 kbps
- High-performance ARM926EJ-S running at up to 225 MHz
- ARM Jazelle Java hardware acceleration for faster Java-based games and other applets
- QDSP4000 high-performance DSP cores
- Integrated Bluetooth 1.2 baseband processor for wireless connectivity to peripherals
- Qcamera™ with 30 fps QCIF viewfinder resolution, and support for 2 MP camera sensors
- Direct interface to digital camera module with video front end (VFE) image processing
- True 3D graphics for advanced wireless gaming
- SecureMSM v2.0 includes support for Open Mobile Alliance (OMA) DRM v2.0, SIM-lock and IMEI integrity. Support for Q-fuse. Only trusted boot is supported
- Audio that is on par with portable music players
- Vocoder support (AMR, FR, EFR, HR)
- Advanced 14 x 14 mm, 0.5 mm pitch, 409-pin lead-free CSP packaging technology
- SD/SDIO hardware support

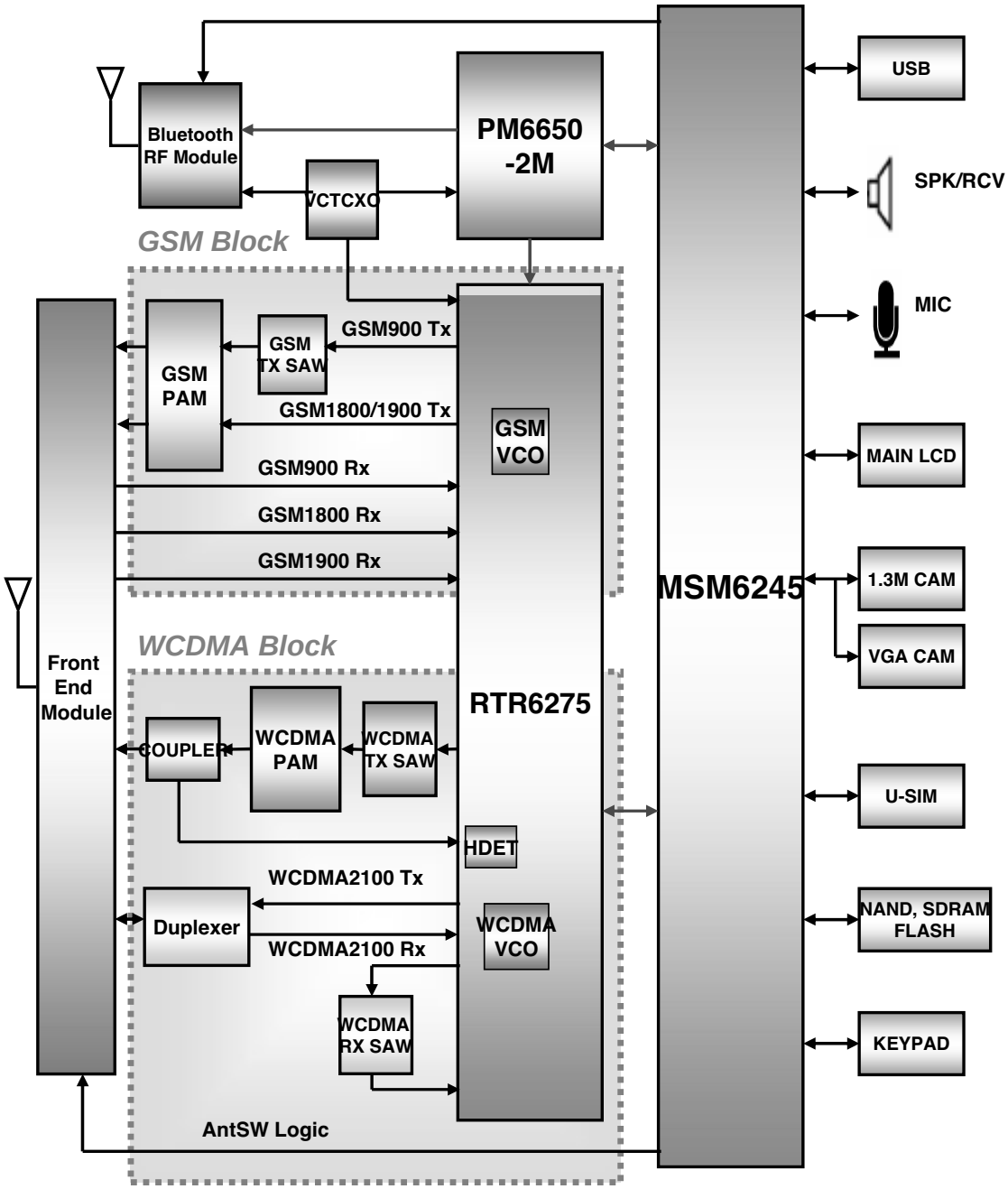


Figure 1.10 Simplified Block Diagram

3.7 Block Diagram(MSM6245)

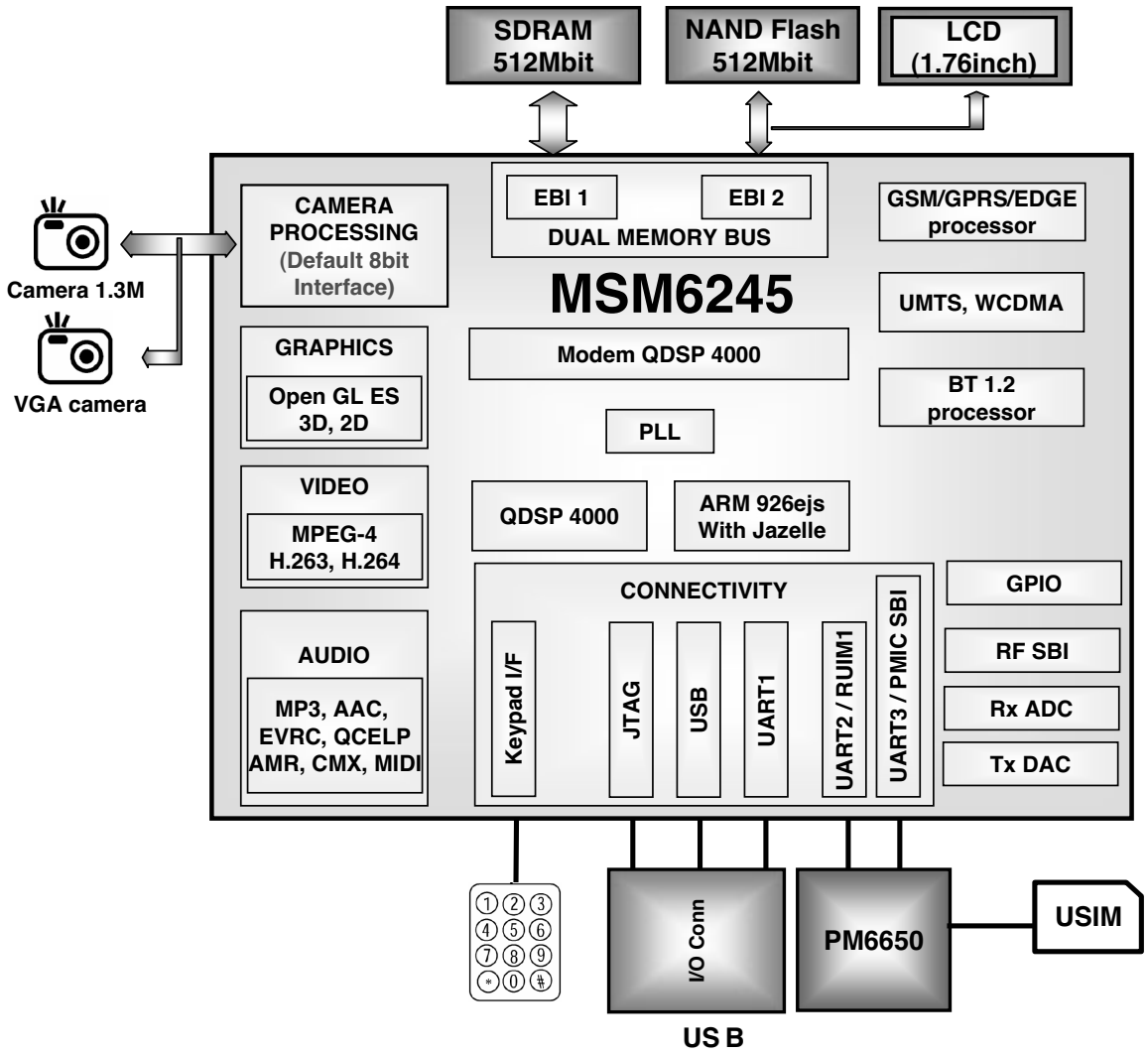


Figure 1.11 Simplified Block Diagram of MSM6245

3.8 Subsystem(MSM6245)

3.8.1. ARM Microprocessor Subsystem

The MSM6245 device uses an embedded ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the MSM, including control of the external peripherals such as the keypad, LCD, RAM, ROM, and EEPROM devices. Through a Generic single-wire serial bus interface (SSBI) the ARM926EJ-S configures and controls the functionality of the RTR6275, RFR6275 and PM6650 devices.

3.8.2. WCDMA R99 features

The MSM6245 device supports release 99 June 2004 of the W-CDMA FDD standard, including the following features:

■ All modes and data rates for W-CDMA frequency division duplex (FDD), with the following restrictions:
  ❏ The downlink supports the following specifications:
    - Up to four physical channels, including the broadcast channel (BCH), if present
    - Up to three dedicated physical channels (DPCHs)
    - Spreading factor (SF) range support from 4 to 256
    - The following transmit diversity modes are supported:
  ❏ Space time transmit diversity (STTD)
  ❏ Time-switched transmit diversity (TSTD)
  ❏ Closed-loop feedback transmit diversity (CLTD)

■ The uplink supports the following specifications:
  ❏ The uplink provides the following UE support:
    - One physical channel, eight TrCH, and 16 TrBks starting at any frame boundary
    - A maximum data rate of 384 kbps
  ❏ Full SF range support from 4 to 256

■ SMS (CS and PS)

■ PS data rate - 384 kbps DL / 384 kbps UL

■ CS data rate - 64 kbps DL / 64 kbps UL

■ AMR (all rates)

3.8.3. GSM features

The following GSM modes and data rates are supported by the MSM6245 device hardware. Support modes conform to release '99 specifications of the sub-feature.

■ Voice features
- ❏ FR
- ❏ EFR
- ❏ AMR
- ❏ HR
- ❏ A5/1, A5/2, and A5/3 ciphering

■ Circuit-switched data features
- ❏ 9.6k
- ❏ 14.4k
- ❏ Fax
- ❏ Transparent and non-transparent modes for CS data and fax
- ❏ No sub-rates are supported.

3.8.4. GPRS features

■ Packet switched data (GPRS)
- ❏ DTM (Simple Class A) operation
- ❏ Multi-slot class 12 data services
- ❏ CS schemes: CS1, CS2, CS3, and CS4
- ❏ GEA1, GEA2, and GEA3 ciphering

■ Maximum of four Rx timeslots per frame

3.8.5. EDGE features

■ EDGE E2 power class for 8 PSK
■ DTM (simple Class A), multi-slot class 12
■ Downlink coding schemes - CS 1-4, MCS 1-9
■ Uplink coding schemes - CS 1-4, MCS 1-9
■ BEP reporting
■ SRB loopback and test mode B
■ 8-bit, 11-bit RACH
■ PBCCH support
■ 1 phase/2 phase access procedures
■ Link adaptation and IR
■ NACC, extended UL TBF.

3.8.6. MSM6245 device audio processing features

■ Integrated wideband stereo CODEC
  ❏ 16-bit DAC with typical 88 dB dynamic range
  ❏ Supports sampling rates up to 48 kHz on the speaker path and 16 kHz on the microphone path
■ VR- Voice mail + voice memo
■ Acoustic echo cancellation
■ Audio AGC
■ Audio Codecs: AMR-NB, AAC, AAC Plus, Enhanced AAC Plus, Windows Audio v9, Real Audio 8 (G2)
■ Internal vocoder supporting AMR, FR, EFR, and HR

3.8.7. MSM6245 microprocessor subsystem

■ Industry standard ARM926EJ-S embedded microprocessor subsystem
  ❏ 16 kB instruction and 16 kB data cache
  ❏ Instruction set compatible with ARM7TDMI®
  ❏ ARM version 5TEJ instructions
  ❏ Higher performance 5 stage pipeline, Harvard cached architecture
  ❏ Higher internal CPU clock rate with on-chip cache
■ Java hardware acceleration
■ Enhanced memory support
  ❏ 75 MHz and 90 MHz bus clock for SDRAM
  ❏ 32-bit SDRAM
  ❏ Dual memory buses separating the high-speed memory subsystem (EBI1) from low-speed peripherals (EBI2) such as LCD panels
  ❏ 1.8 memory interface support for EBI1 and 1.8 V or 2.6 V memory interface support EBI2
  ❏ NAND FLASH memory interface
    - 8/16-bit data I/O width NAND flash support
    - 1- or 4-bit ECC
    - 512-byte/2KB page-size support
    - 2 chip selects supported for NAND Flash
  ❏ Boot from NAND
  ❏ Low-power SDRAM (LP-SDRAM) interface
■ Internal watchdog and sleep timers

3.8.8. Supported interface features

■ USB On-the-Go core supports both slave and host functionality
■ Three universal asynchronous receiver transmitter (UART) serial ports
■ USIM controller (via UART)
■ Integrated 4-bit secure digital (SD) controller for SD and Mini SD cards
■ Parallel LCD interface
■ General-purpose I/O pins
■ External keypad interface

3.8.9. Supported multimedia features

■ Provide additional general purpose MIPS by using:
  ❏ Two QDSP4000s
  ❏ Dedicated hardware accelerators and compression engines
■ Improve Java, BREW, and game performance
  ❏ Integrated Java and 2D/3D graphics accelerator with Sprite engine
■ Enable various accessories via USB host connectivity.
  ❏ Integrated USB host controller functionality
■ Enable compelling visual and audio applications.

Qcamera™

■ High-quality digital camera processing, supporting CCD or CMOS image sensors up to 2MP
■ 30 fps QCIF viewfinder

Qtv™

■ Audio and video decoder that supports VOD, MOD and Broadcast multimedia services.
■ Audio codecs supported: AMR-NB, AMR-WB, AMR-WB+, AAC, AAC Plus, Enhanced AAC Plus, Windows® Media Audio v9, RealAudio® v8
■ Integrated stereo wideband codec for music/digital clips
■ CMX
■ Video codecs supported: MPEG-4, H.263, H.264, Windows Media® v9 and RealNetworks® v10

Video telephony services: Qvideophone™

■ A two-way mobile video conferencing solution that delivers 15 fps @ QCIF, 64kbps
■ Video codecs supported: MPEG-4 and H.263
■ Audio codecs supported: AMR-NB.

Qcamcorder™

■ Real time mobile video encoder
■ Video codecs supported: MPEG-4, H.263.H.264
■ Audio codecs supported: AMR-NB
■ Recording performance: 15 fps @ QCIF, 192 kbps

CMX™ (MIDI and still image, animation, text, LED/vibrate support)

■ 72 simultaneous polyphonic tones
■ 44 kHz sampling rate
■ 512 kB wave table
■ Support of universal file formats
  ❏ Standard MIDI Format (SMF)
  ❏ SP-MIDI
  ❏ SMAF Audio playback (MA-2, MA-3, MA-5)
  ❏ XMF/OLS
  ❏ MFi (requires Docomo license)

■ PNG decoder
■ Pitch bend range support
■ LED/vibrate support
■ Scalable Vector Graphics (SVG- Tiny 1.1 + SVG Tiny 1.2)
■ MLZ decoder
■ Integrated PNG/SAF A.T.

Features	MSM6245
Modem	Tri-band WCDMA Quad-band GSM/GPRS/EDGE WEDGE DTM
Processor	ARM926 EJ-S – 225 MHz AHB – 75 MHz ARM926 EJ-S – 122 MHz AHB – 61 MHz for limited MM QDSP – 100 MHz
Process technology	65 nm
Supported RF platforms (see Table 1-2 for platform definition)	Platform B (RTR6275 + RFR6275) Platform E (RTR6275 + RFR6275) Platform F (RTR6285)
HSDPA	Not supported
Enhanced antenna	SAIC
Memory configuration	8/16-bit NAND and 32-bit SDRAM (See Note 1)
Broadcast interface	Not supported
Power management IC	PMIC 6650-2
USB	3-wire USB-OTG
MDDI	Supported
Boot mode	Trusted boot mode only
Qcamera (camera interface) Viewfinder frame rate	Up to 2.0M pixel support 30 fps @ QCIF
Qcamcorder (recording performance)	15 fps @ QCIF
Qtv (video decode)	15 fps QCIF streaming, 15 fps QCIF playback
Audio/video decoders	MP3, AAC, AAC+, ADPCM, MPEG4, H.263, H.264, Real networks, Windows media, WB-AMR/+
Qvideophone (video telephony)	15 fps @ QCIF
LCD HW Interface	18 bpp

Table 1-1 Summary of MSM6245 device features

Note:
1. At this time, only 32-bit SDRAM is supported on the MSM6245 device. There are potential MIPS issues when running Bluetooth and video telephony concurrently with any other memory configuration. 16-bit SDRAM and NOR FLASH are currently being evaluated and documentation will be updated accrdingly in the next revision.

Platform	Chipset	Mode/band	Band Class
Platform B	RTR6275 IC RFR6275 IC	UMTS 850, 1900, 2100 GSM/GPRS/EDGE 850/900/1800/1900	5, 2, 1
Platform E	RTR6275 IC RFR6275 IC	UMTS 850, 1900, 2100 GSM/GPRS/EDGE 850/900/1800/1900 EU 900 UMTS AWS 1.7UL:2.1 DL JPN 1700 UMTS	5, 2, 1 8 4 9
Platform F	RTR6285 IC	US: UMTS 850, AWS, 1900 JP: UMTS 800, 1700, 2100 EU: UMTS 900, 2100 GSM/GPRS/EDGE 850/900/1800/1900	5, 4, 2 6, 9, 1 8, 1

Table 1-2 Description of RF configurations

3.8.10. Stereo Wideband CODEC

The MSM6245 device integrates a wideband voice/audio CODEC into the mobile station modem (MSM). The CODEC supports two differential microphone inputs, one differential earphone output, one single-ended earphone output, and a differential analog auxiliary interface.
The CODEC integrates the microphone and earphone amplifiers into the MSM6245 device, reducing the external component count to just a few passive components.
The microphone (Tx) audio path consists of a two-stage amplifier with the gain of the second stage set externally. The Rx/Tx paths are designed to meet the ITU-G.712 requirements for digital transmission systems.

3.8.11. Vocoder Subsystem

The MSM6245 device's QDSP4000 supports AMR,FR,EFR and HR. In addition, the QDSP4000 has modules to support DTMF tone generation, DTMF tone detection, Tx/Rx volume controls, Tx/Rx automatic gain control (AGC), Rx Automatic Volume Control (AVC), ear seal echo canceller (ESEC), Acoustic Echo Canceller (AEC), Noise Suppression (NS), and programmable, 13-tap, Type-I, FIR, Tx/Rx compensation filters. The MSM6245 device's integrated ARM9TDMI processor downloads the firmware into the QDSP4000 and configures QDSP4000 to support the desired functionality.

3.8.12. ARM Microprocessor subsystem

The MSM6245 device uses an embedded ARM926EJ-S microprocessor. This microprocessor, through the system software, controls most of the functionality for the MSM device, including control of the external peripherals such as the keypad, LCD, RAM, ROM, and EEPROM devices. Through a generic single serial bus interface (SSBI) the ARM926EJ-S configures and controls the functionality of the RFR6275, RTR6275, and PM6650 devices.

3.8.13. Mode Select and JTAG Interfaces

The mode pins to the MSM6245 device determine the overall operating mode of the ASIC. The options under the control of the mode inputs are Native mode, which is the normal subscriber unit operation, ETM mode, which enables the built-in trace mode, and test mode for factory testing. The MSM6245 device meets the intent of the ANSI/IEEE 1149.1A-1993 feature list. The JTAG interface can be used to test digital interconnects between devices within the mobile station during manufacture.

3.8.14. General-Purpose Input/Output Interface

The MSM62450 device has general-purpose bidirectional input/output pins. Some of the GPIO pins have alternate functions supported on them. The alternate functions include USB interface, additional RAM, ROM, general-purpose chip selects, parallel LCD interface, and a UART interface. The function of these pins is documented in the various software releases.

3.8.15. UART

The MSM6245 device employs three UARTs. UART1 has dedicated pins while UART2 and UART3 share multiplexed pins.

3.8.16. USB

The MSM6245 device integrates a universal serial bus (USB) controller that supports both unidirectional and bidirectional transceiver interfaces. The USB controller acts as a USB peripheral communicating with the USB host. MSM6245 supports the 3-wire functionality.

3.9 Power Block

3.9.1. General

MSM6245, included RF, is fully covered by PM6650(Qualcomm PMIC). PM6650 cover the power of MSM6245, MSM memory, RF block, Bluetooth, USIM and TCXO. Major power components are :

3.9.2. PM6650

The PM6650 device (Figure 1-1) integrates all wireless handset power management. The power management portion accepts power from all the most common sources - battery, external charger, adapter, coin cell back-up - and generates all the regulated voltages needed to power the appropriate handset electronics. It monitors and controls the power sources, detecting which sources are applied, verifying that they are within acceptable operational limits, and coordinates battery and coin cell recharging while maintaining the handset electronics supply voltages.

Eight programmable output voltages are generated using low dropout voltage regulators, all derived from a common trimmed voltage reference. A dedicated controller manages the TCXO warm-up and signal buffering, and key parameters (under-voltage lockout and crystal oscillator signal presence) are monitored to protect against detrimental conditions.

MSM device controls and statuses the PM6650 IC using Single Serial Bus Interface (SSBI) supplemented by an Interrupt Manager for time-critical information. Another dedicated IC Interface circuit monitors multiple trigger events and controls the power-on sequence.

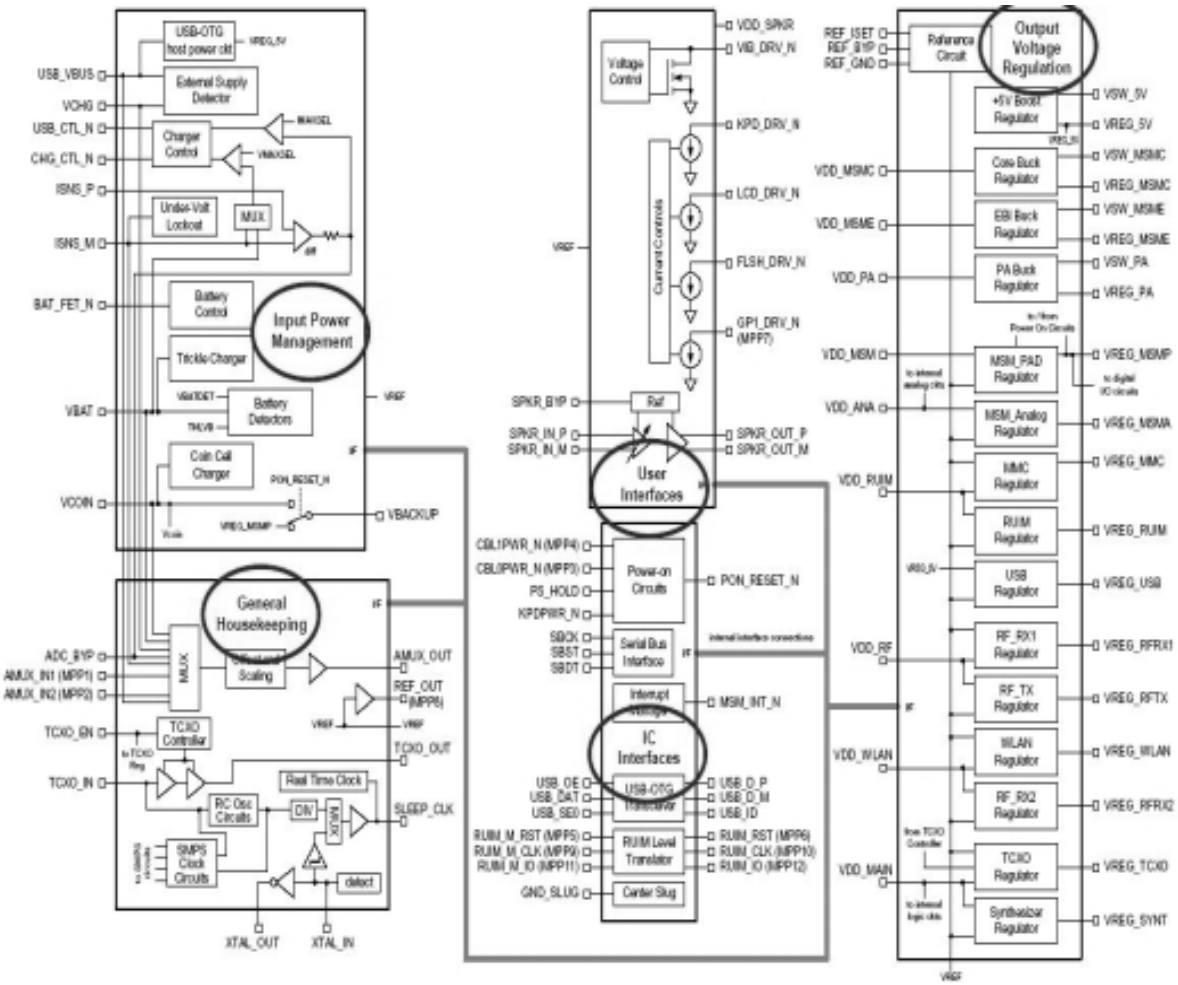
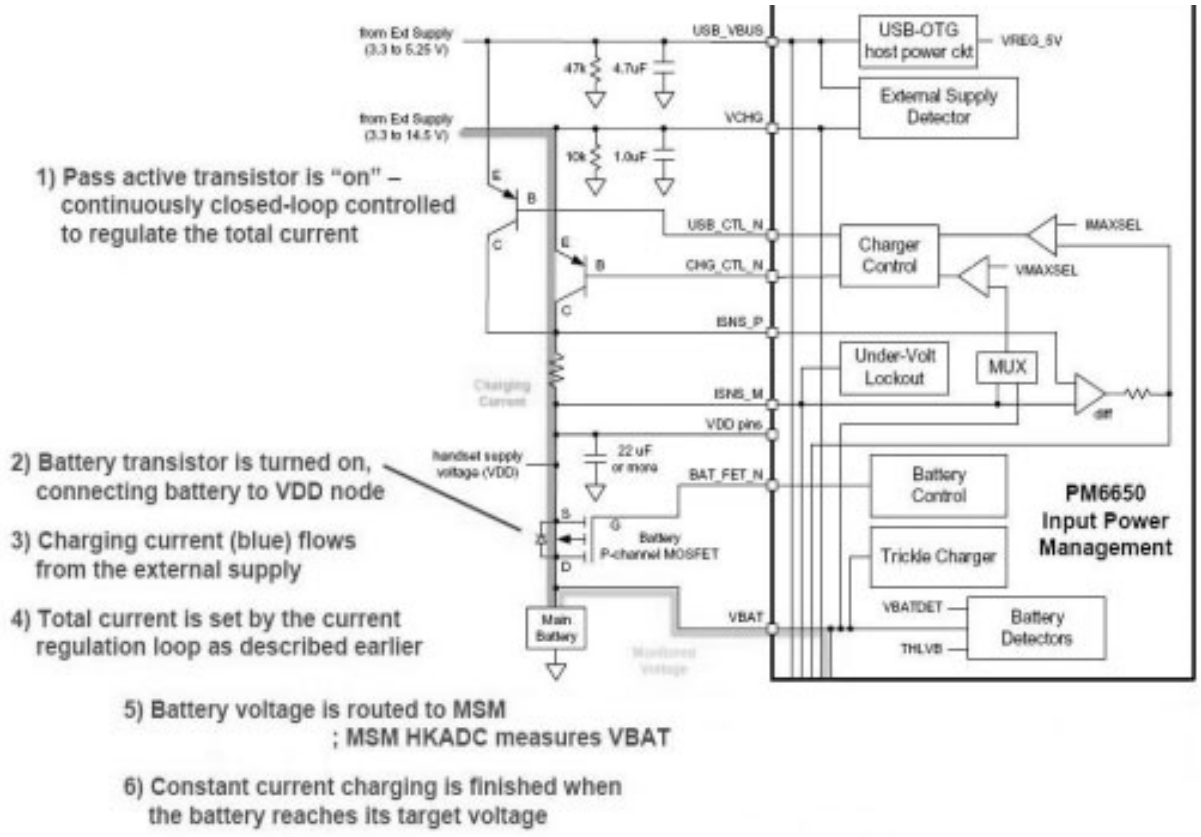
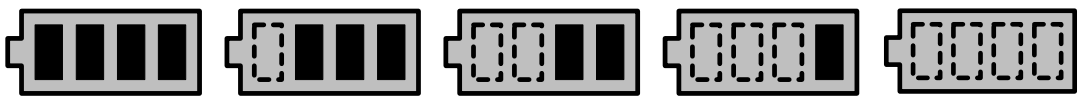


Figure 1.12 PM6650 Functional Block Diagram

3.9.3. Charging control

A programmable charging block in PM6650 is used for battery charging. It is possible to set limits for the charging current. The external supply typically connects directly to pin (VCHG). The voltage on this pin (VCHG) is monitored by detection circuitry to ascertain whether a valid external supply is applied or not. For additional accuracy or to capture variations over time, this voltage is routed internally to the housekeeping ADC via the analog multiplexer. PM6650 circuits monitor voltages at VCHARGER and ICHARGE pins to determine which supply should be used and when to switch between the two supplies. These pins are connected to the Source (or emitter) and Drain (or collector) contacts of the pass transistor respectively.





4.2V~3.82V 100~70 (%)	3.81V~3.74V 69~45 (%)	3.73V~3.69V 44~20 (%)	3.68V~3.59V 19~3 (%)	3.58V~3.20V 2~0 (%)

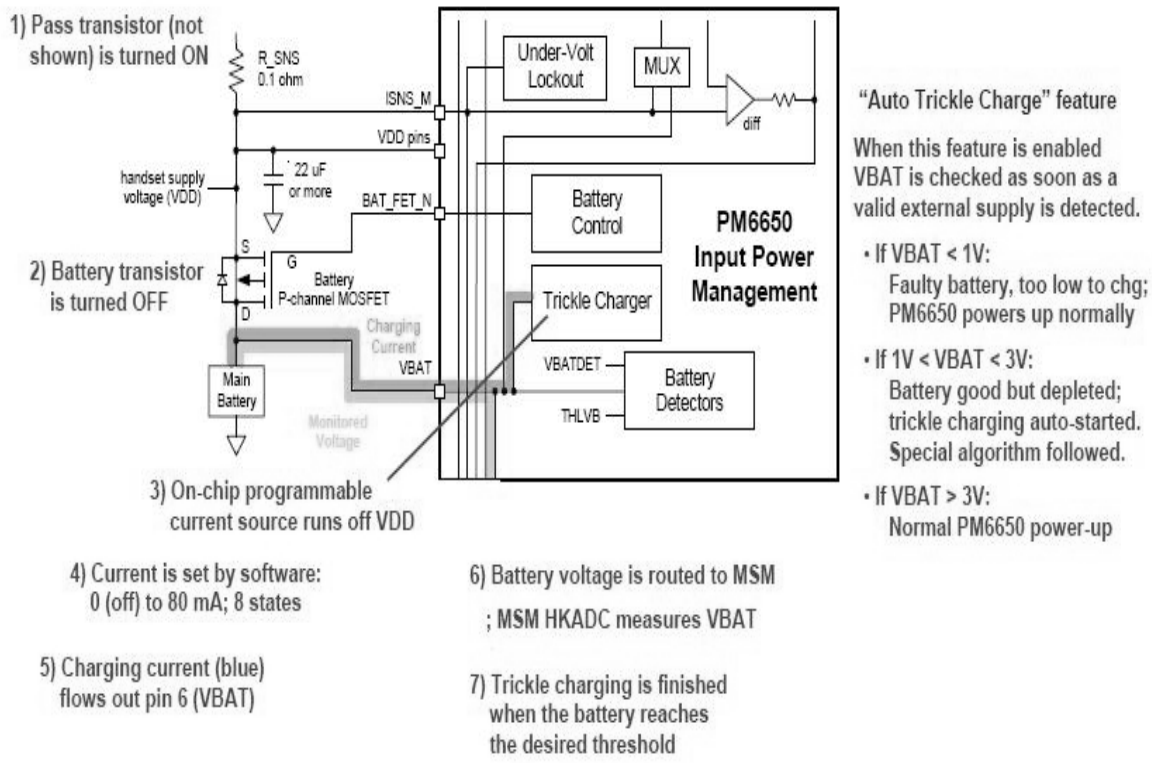
Figure 1.13 U250/KU250 Battery Bar Display(Stand By Condition)

3. TECHNICAL BRIEF

Trickle Charging

Trickle Charging of the main battery, enabled through SBI control and powered from V_{DD}, is provided by the PM6650 IC, The trickle charger is on-chip programmable current source that supplies current from V_{DD} to pin (VBAT). Trickle charging can be used for lithium-ion and nickelbased batteries, with its performance specified below (3.2V). The charging current is set to 80mA.

Parameter	Min	Typ	Max	Unit
Trickle Current	60	80	100	mA



Constant Current Charging

The PM6650 IC supports constant current charging of the main battery by controlling the charger pass transistor and the battery transistor. The constant current charging continues until the battery reaches its target voltage, 4.2V.

Constant Voltage Charging

Constant voltage charging begins when the battery voltage reaches a target voltage, 4.2V. The end of constant voltage charging is commonly detected 10% of the full charging current.

- Charging Method : CC & CV (Constant Current & Constant Voltage)
- Maximum Charging Voltage : 4.2V
- Maximum Charging Current : 600mA
- Nominal Battery Capacity : 950mAh
- Charger Voltage : 5.1V
- Charging time : Max 3h (Except time trickle charging)
- Full charge indication current (icon stop current) : 100mA
- Low battery POP UP : Idle - 3.58V, Dedicated(GSM/WCDMA) - 3.58V
- Low battery alarm interval : Idle - 3 min, Dedicated - 1min
- Cut-off voltage : 3.20V

3.10 External memory interface

The MSM6245 device was designed to provide two distinct memory interfaces. EBI1 was targeted for supporting high speed synchronous memory devices. EBI2 was targeted towards supporting slower asynchronous devices such as LCD, NAND flash, SDRAM, etc.

• EBI1 Features

- 16 bit static and dynamic memory interface
- 32 bit dynamic memory interface
- 24 bits of address for static memory devices which can support up to 32MBytes on each chip select
- Synchronous burst memories supported (burst NOR, burst PSRAM)
- Synchronous DRAM memories supported
- Byte addressable memory supporting 8 bit, 16 bit and 32 bit accesses
- Pseudo SRAM (PSRAM) memory support

• EBI2 Features

- Support for asynchronous FLASH and SRAM(16bit & 8bit).
- Interface support for byte addressable 16bit devices (UB_N & LB_N signals).
- Support for 8 bit/16bit wide NAND flash.
- Support for parallel LCD interfaces, port mapped of memory mapped(18 or 16 bit).

• 512Mb NAND(8bit) flash memory + 512Mb SDRAM (32bit)

Interface Spec				
Device	Part Name	Maker	Read Access Time	Write Access Time
FLASH	HYC0UEH0MF3P	hynix	60 ns	60 ns
SDRAM	HYC0UEH0MF3P	hynix	7 ns	7 ns

Table#1. External memory interface

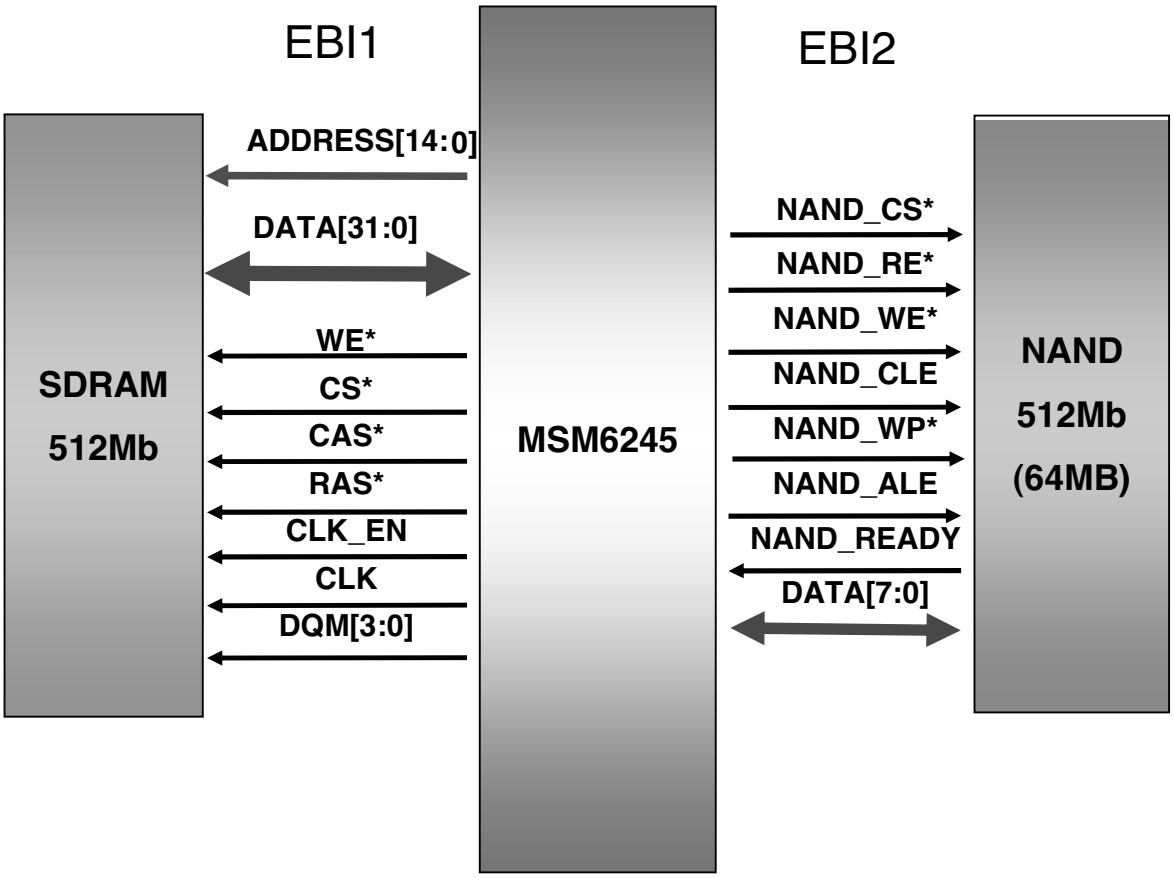


Figure 1.14 Simplified Block Diagram of Memory Interface

3.11 H/W Sub System

3.11.1. RF Interface

A. RTR6275(WCDMA_Tx, GSM_Tx/Rx)

MSM6245 controls RF part(RTR6275) using these signals.

- SBST : SSBI I/F signals for control Sub-chipset
- PA_ON1 : Power AMP on RF part
- RX0_I/Q_M/P,TX_I/Q_M/P : I/Q for T/Rx of RF
- TX_AGC_ADJ : control the gain of the Tx signal prior to the power amplifier
- DAC_REF : Reference input to the MSM Tx data DACs

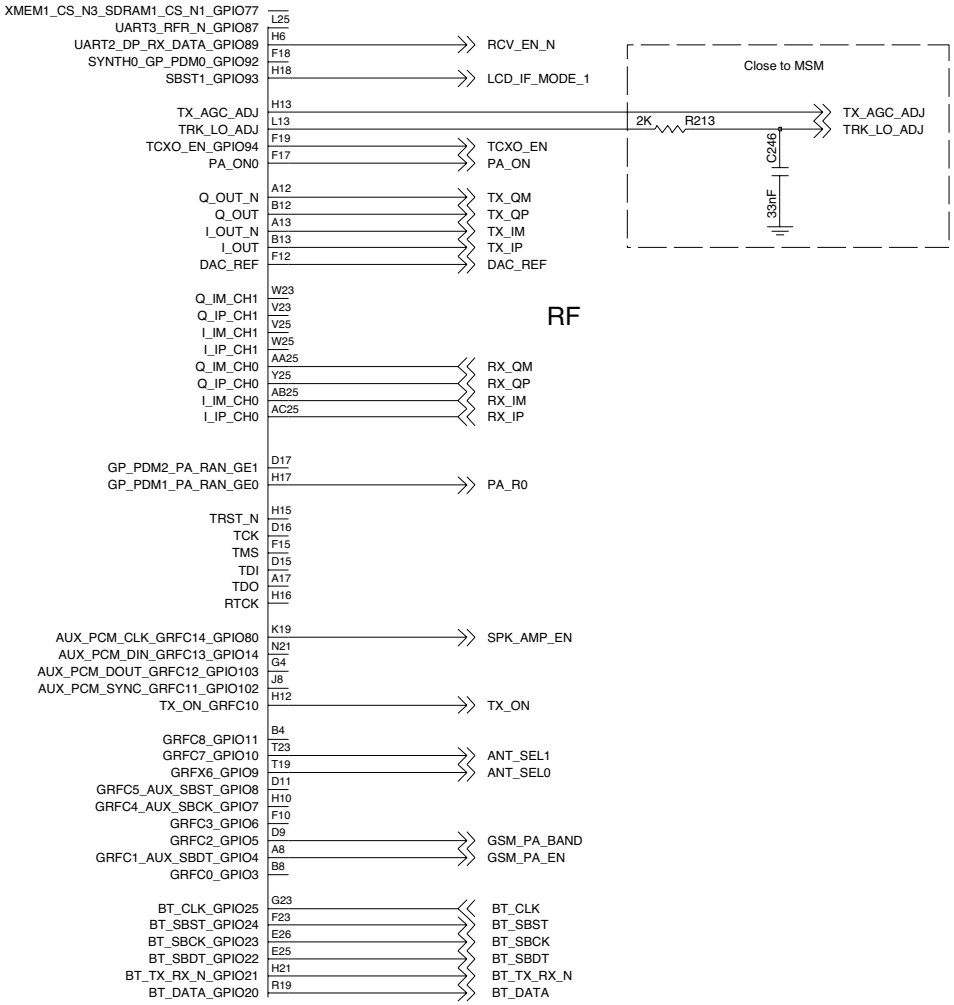


Figure 1.15 Schematic of RF Interface of MSM6245

B. the others

• TRK_LO_ADJ : TCXO(19.2M) Control

• PA_ON : WCDMA(2100) TX Power Amp Enable

• ANT_SEL[0-2] : Ant Switch Module Mode Selection(WCDMA,GSM Tx/Rx,DCS-PCS Tx/Rx)

• GSM_PA_BAND : GSM/DCS-PCS Band Selection of Power Amp

• GSM_PA_RAMP : Power Amp Gain Control of APC_IC

• GSM_PA_EN : Power Amp Gain Control Enable of APC_IC

3.11.2. MSM Sub System

3.11.2.1. USIM Interface

SIM interface scheme is shown in Figure.

And, there control signals are followed

- USIM_CLK : USIM Clock
- USIM_Reset : USIM Reset
- USIM_Data : USIM Data T/Rx

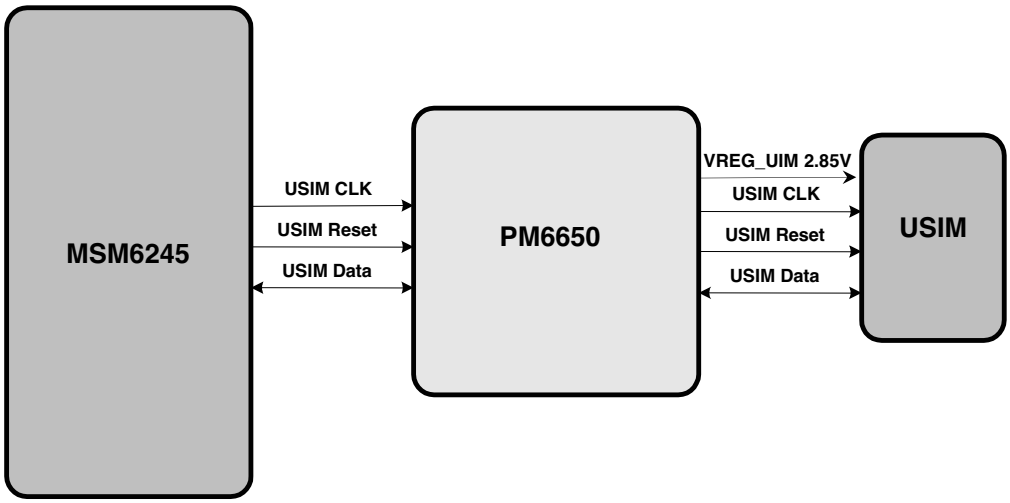


Figure 1.16 SIM Interface

3.11.2.2. UART Interface

UART signals are connected to MSM GPIO through IO connector with 115200 bps speed.

GPIO_Map	Name	Note
GPIO_96	UART_RXD	Data_Rx
GPIO_95	UART_TXD	Data_Tx

Table. UART Interface

3.11.2.3. USB

The MSM6245 device contains a Universal Serial Bus (USB) interface to provide an efficient interconnect between the mobile phone and a personal computer (PC). The USB interface of the MSM6245 was designed to comply with the definition of a peripheral as specified in USB Specification, Revision 1.1. Therefore, by definition, the USB interface is also compliant as a peripheral with the USB Specification, Revision 2.0. The USB Specification Revision 1.1 defines two speeds of operation, namely low-speed (1.5 Mbps) and full-speed (12 Mbps), both of which are supported by the MSM6245.

Name	Note
USB_DAT	Data to/from MSM
USB_SE0	Data to/from MSM
USB_OE_N	Out-Put Enable of Transceiver
USB_VBUS	USB_Power From Host(PC)
USB_D+	USB Data+ to Host
USB_D-	USB Data- to Host

Table. USB Signal Interface

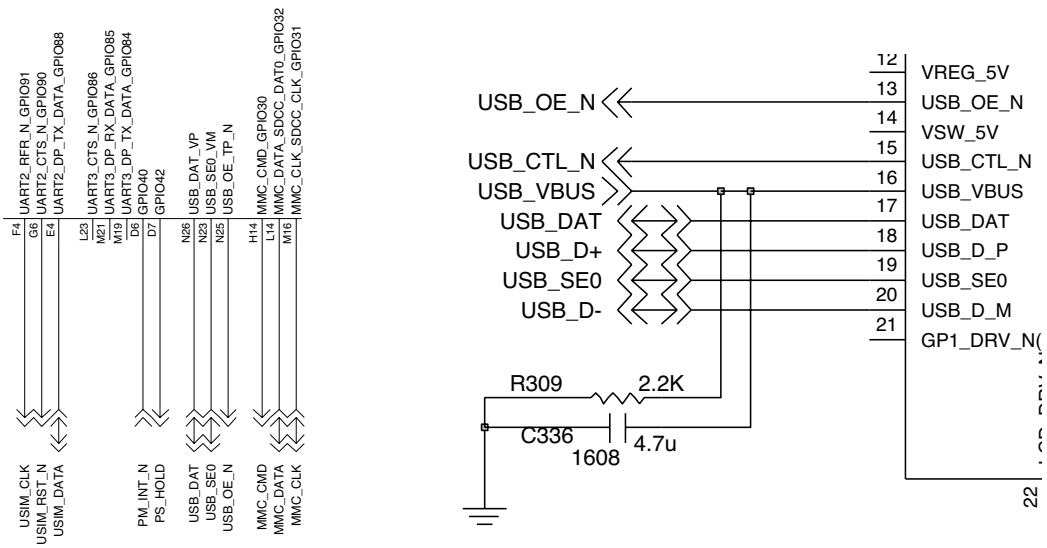


Figure 1.17 Schematic of USB block(MSM6245 Side & PM6650 Side)

3.11.3 HKADC(House Keeping ADC)

The MSM6245 device has an on-chip 8-bit analog-to-digital converter (HKADC) which is tended to digitize DC signals corresponding to analog parameters such as battery voltage, temperature, and RF power levels. The MSM6245 device has six analog input pins which are multiplexed to the input of the internal HKADC.

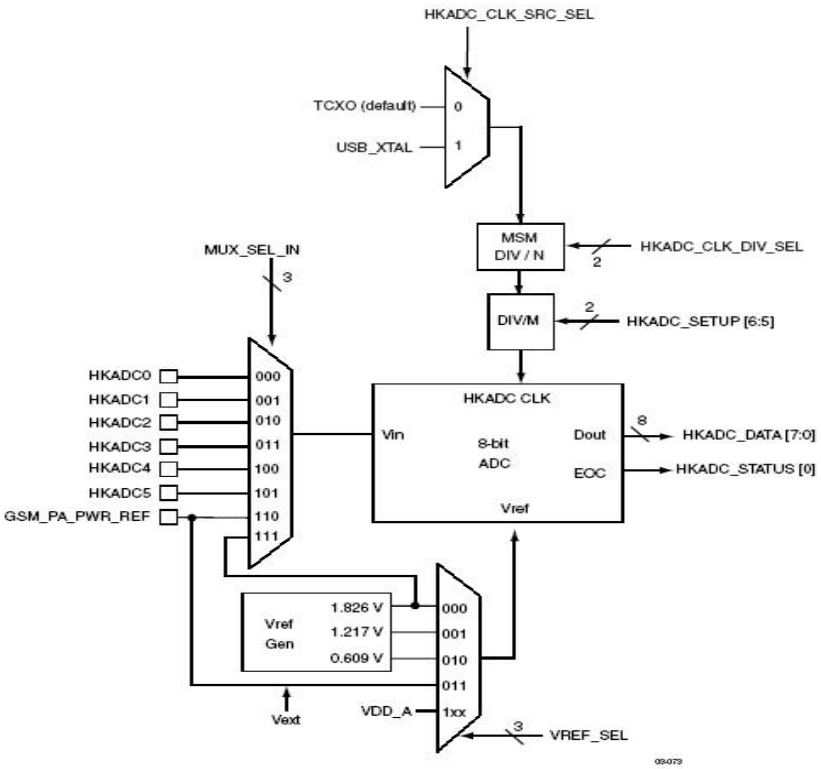


Figure 1.18 MSM6245 HKADC Block diagram

Channel	Signal	Note
HKADC0	AMUX_OUT	RF PAM Temperature Check
HKADC1	VBATT_SENSE	Battery voltage level
HKADC2	NC	NC
HKADC3	NC	NC
HKADC4	PCB_Rev_ADC	PCB Version Check
HKADC5	Battery_THERM	Battery Temperature Check

Table. HKADC channel table

3.11.4. Key Pad

There are 23 main key buttons in Figure.

Shows the Keypad circuit. ‘END’ Key is connected to PMIC(PM6650).

	COL0	COL1	COL2	COL3	COL4
ROW(0)			-	CLR	MENU
ROW(1)	1	2	3	LEFT	UP
ROW(2)	4	5	6	OK	RIGHT
ROW(3)	7	8	9	SEND	SEARCH
ROW(4)	*	0	#	DOWN	BACK

Table. Key Matrix Mapping Table

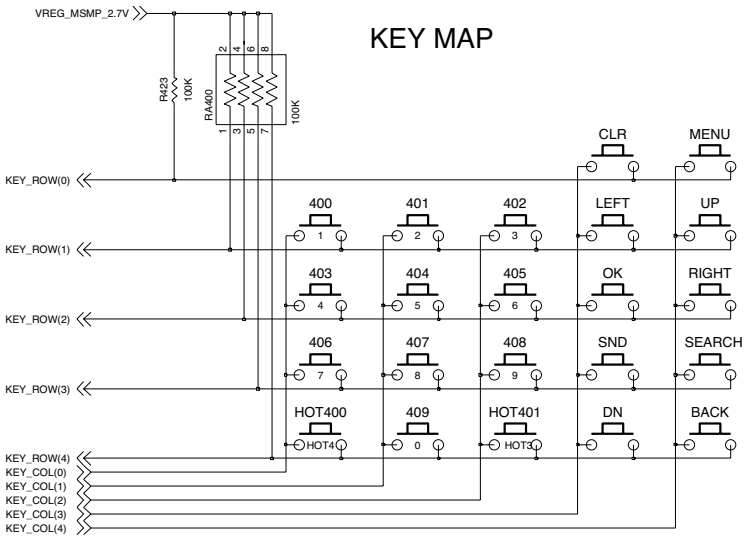


Figure 1.19 Main Keypad Circuit

Figure 1.20 END Keypad Circuit

3.11.5 Camera Interface

U250/KU250 Installed a 1.3M Pixel and 0.3Mega Camera. Below figure shows the camera socket type connector and camera I/F signal.

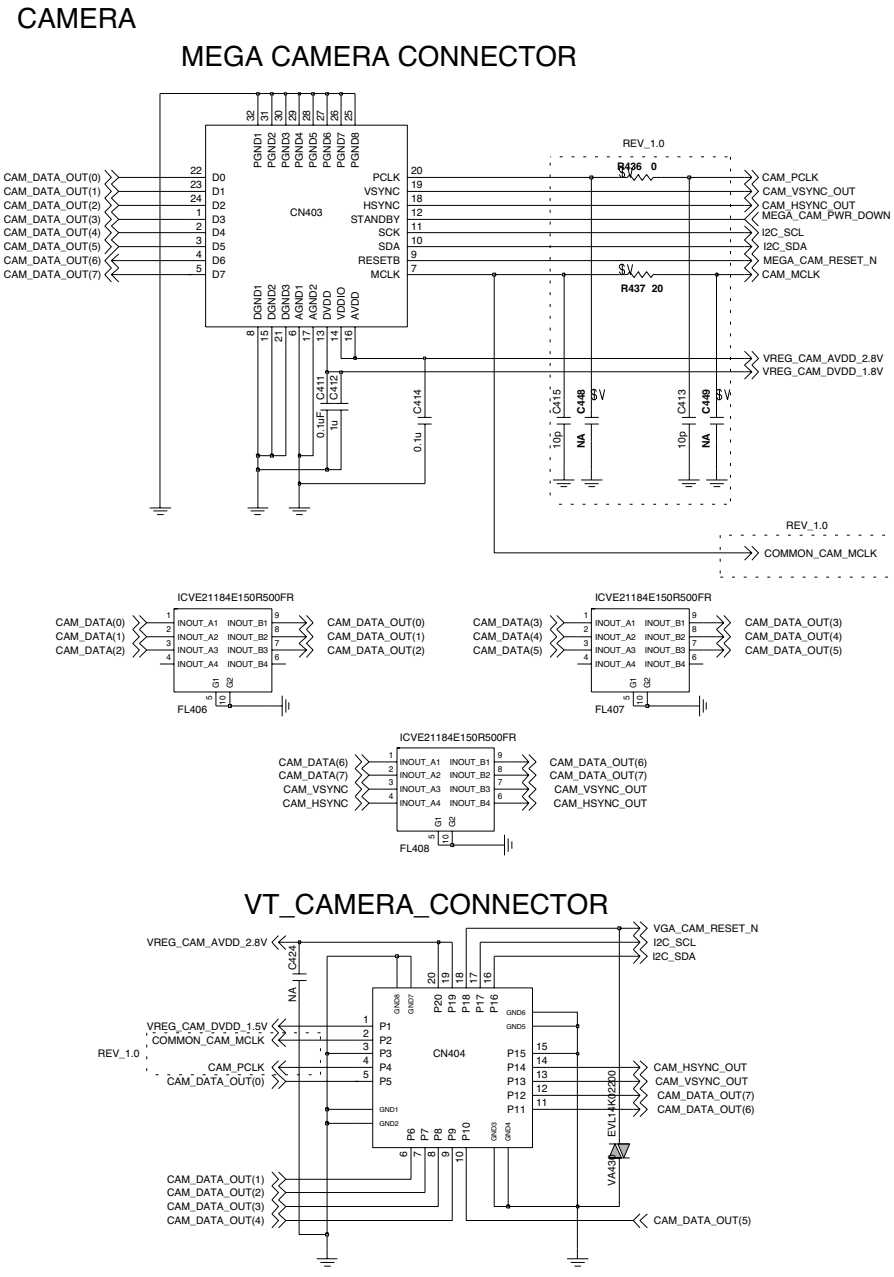


Figure 1.21 Camera Socket Type Connector

The MEGA Camera module is connected to socket type connector with 24 pin (F95M08). Its interface is dedicated camera interface port in MSM6245. The camera port supply 24.576MHz master clock to camera module and receive 49.152MHz pixel clock (15fps), vertical sync signal, horizontal sync signal, reset signal and 8bits data from camera module. The camera module is controlled by I2C port from MSM6245.

No	Name	Port	Note
1	CAM_DATA_OUT(3)	O	Data
2	CAM_DATA_OUT(4)	O	Data
3	CAM_DATA_OUT(5)	O	Data
4	CAM_DATA_OUT(6)	O	Data
5	CAM_DATA_OUT(7)	O	Data
6	GND	GND	GND
7	MCLK	I	Master Clock(24.576M)
8	GND	GND	GND
9	MEGA_CAM_RESET_N	I	Camera reset signal
10	I2C_SDA	O	I2C Data
11	I2C_SCL	O	I2C Clock
12	MEGA_CAM_PWR_DN	I	Camera power down
13	VREG_CAM_DVDD_1.8V	I	DVDD
14	VREG_CAM_AVDD_2.8V	I	VDDIO
15	GND	GND	GND
16	VREG_CAM_AVDD_2.8V	I	AVDD
17	GND	GND	GND
18	CAM_HSYNC_OUT	O	Horizontal Sync
19	CAM_VSYNC_OUT	O	Vertical Sync
20	CAM_PCLK	O	Pixel Clock (49.152M)
21	GND	GND	GND
22	CAM_DATA_OUT(0)	O	Data
23	CAM_DATA_OUT(1)	O	Data
24	CAM_DATA_OUT(2)	O	Data

Table. Interface between MEGA Camera Module and MAIN PCB (in camera module)

3. TECHNICAL BRIEF

The VGA Camera module is connected to socket type connector with 20 pin (CLE9120-2761E). Its interface is dedicated camera interface port in MSM6245. The camera port supply 24.576MHz master clock to camera module and receive 12.288MHz pixel clock (15fps), vertical sync signal, horizontal sync signal, reset signal and 8bits data from camera module.
The camera module is controlled by I2C port from MSM6245.

No	Name	Port	Note
1	VREG_CAM_DVDD_1.8V	I	DVDD
2	CAM_MCLK	I	Master Clock(24.576M)
3	GND	GND	GND
4	CAM_PCLK	O	Clock for Camera Data Out(12.288M)
5	CAM_DATA(0)	O	Data
6	CAM_DATA(1)	O	Data
7	CAM_DATA(2)	O	Data
8	CAM_DATA(3)	O	Data
9	CAM_DATA(4)	O	Data
10	CAM_DATA(5)	O	Data
11	CAM_DATA(6)	O	Data
12	CAM_DATA(7)	O	Data
13	CAM_VSYNC	O	Vertical Sync
14	CAM_HSYNC	O	Horizontal Sync
15	GND	GND	GND
16	I2C_SDA	I	I2C Data
17	I2C_SCL	I	I2C Clock
18	VGA_CAM_RESET_N	I	Camera reset signal
19	VREG_AVDD_2.8V	I	Camera I/O Power
20	VREG_AVDD_2.8V	I	Camera I/O Power

Table. Interface between VGA Camera Module and MAIN PCB (in camera module)

3.11.6 Keypad Light

There are 8 Blue LEDs in Main key backlight circuit, which are driven by KYDB_BACKLIGHT line from PM6650.

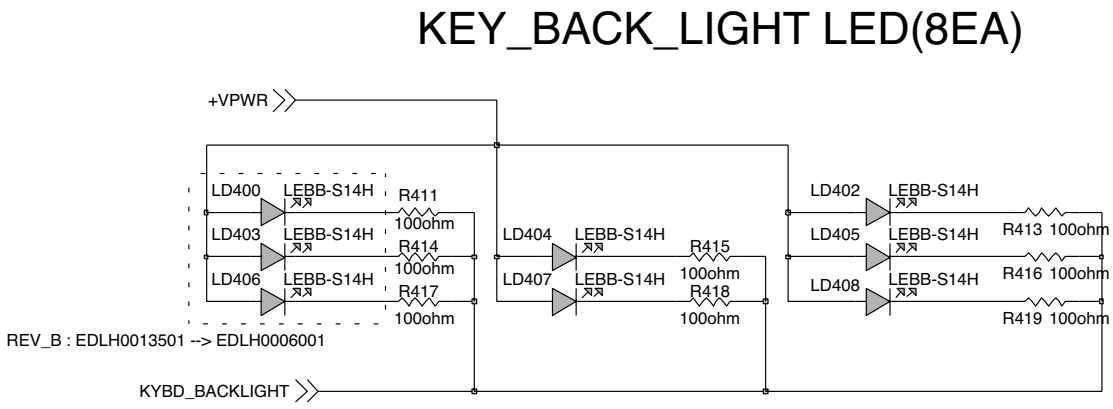


Figure 1.22 Schematic of KEY back light circuit (KEY side)

3.11.7. LCD Module (NM176CN1 : Tovis)

- The NM176CN1 model is a Color TFT Main supplied by Tovis. This LCD Module has a 1.76 inch diagonally measured active display area with 176(RGB)X220 resolution. each pixel is divided into Red, Green and Blue sub-pixels and dots which are arranged in vertical stripes.

* Features

- Display mode(Main LCD) : Normally White, Transmissive TN mode 265K colors.
- LCD Driver IC: NT3916 (NOVATEK).
- 16 bit CPU interface Parallel

3.11.8. Display & LCD FPC Interface

LCD module is connected to LCD KEY FPCB with 35 pin (XF2B-3545-31A / OMROM) The LCD module is controlled by 16-bit EBI2 in MSM6245.

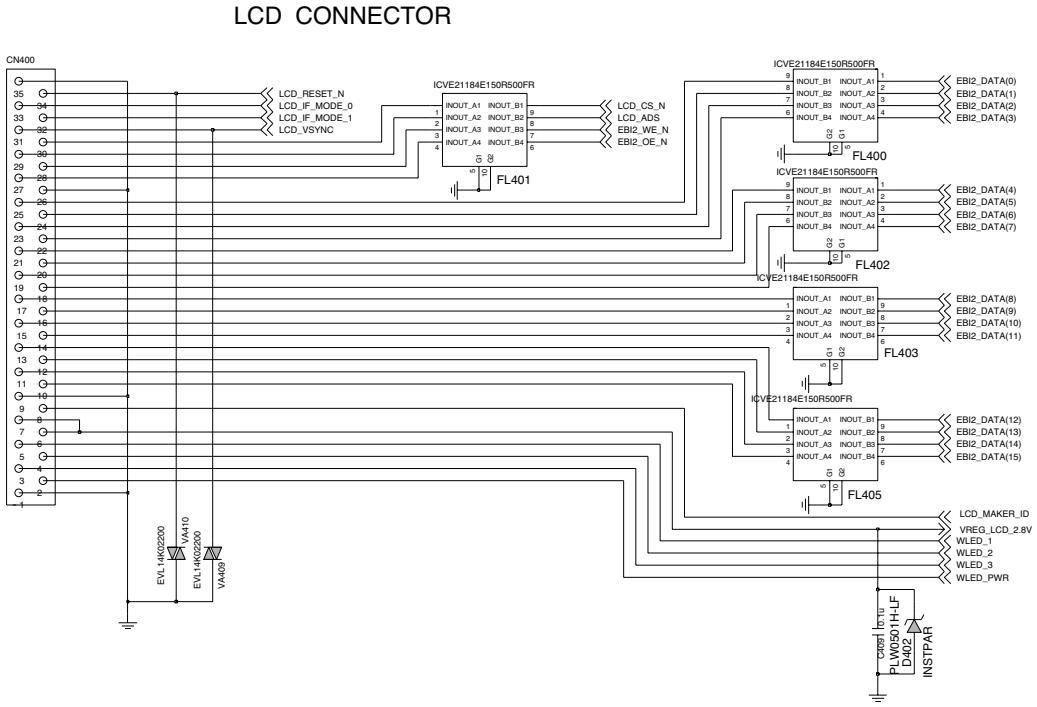


Figure 1.23 Interface between LCD Module and MAIN PCB.

3.11.8.1. Audio Signal Processing & Interface

Audio signal processing is divided uplink path and downlink path. The uplink path amplifies the audio signal from MIC and converts this analog signal to digital signal and then transmits it to DBB Chip (MSM6245). This transmitted signal is reformed to fit in GSM & WCDMA frame format and delivered to RF Chipset. The downlink path amplifies the signal from DBB chip (MSM6245) and outputs it to receiver (or speaker).

The receive path can be directed to either one of two earphone amplifiers or the auxiliary output. The outputs earphone1 (EAR1OP, EAR1ON) and auxiliary out (LINE_P, LINE_N) are differential outputs. Earphone2 (HPH_L, HPH_R) is a single-ended output stage designed to drive a headset speaker.

The microphone interface consists of two differential microphone inputs, one differential auxiliary input and a two-stage audio amplifier.

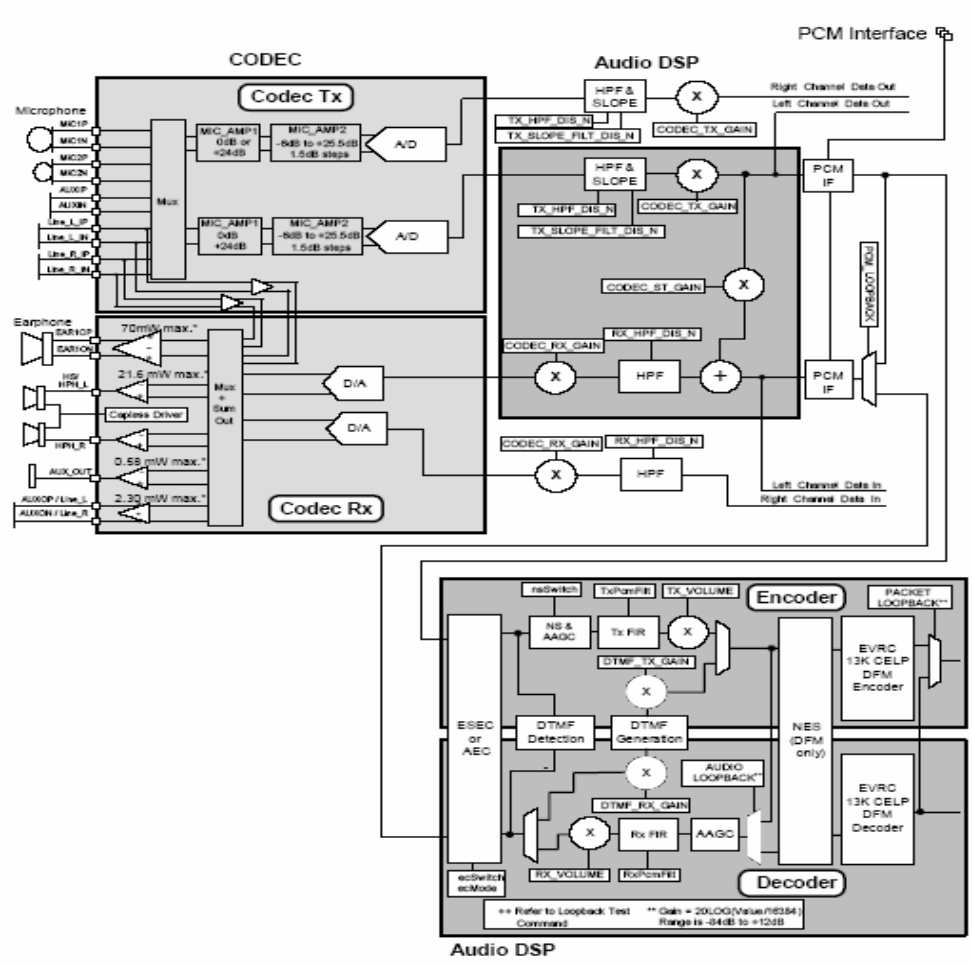


Figure 1.24 Audio Interface Detailed Diagram(MSM6245)

MSM6245 CODEC pins

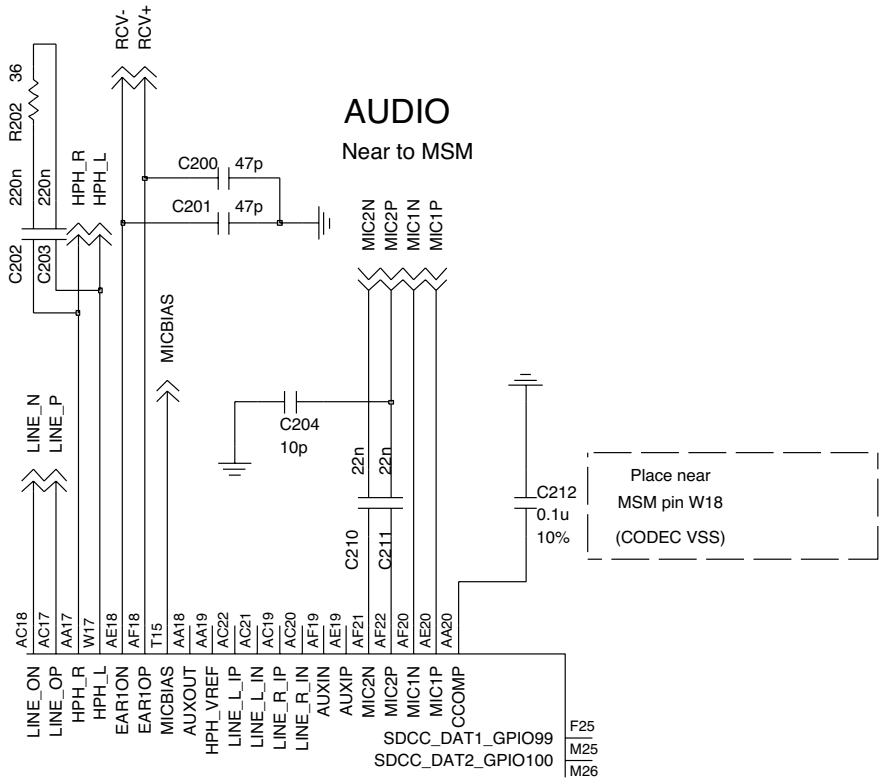


Figure 1.25 Audio part schematics

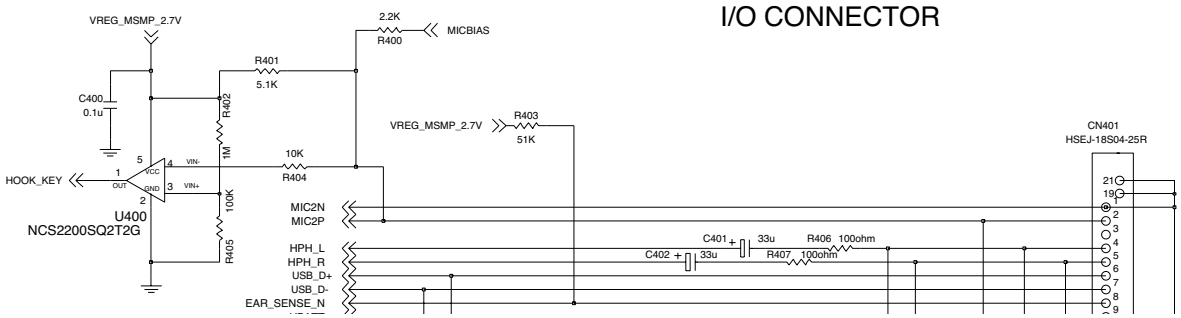
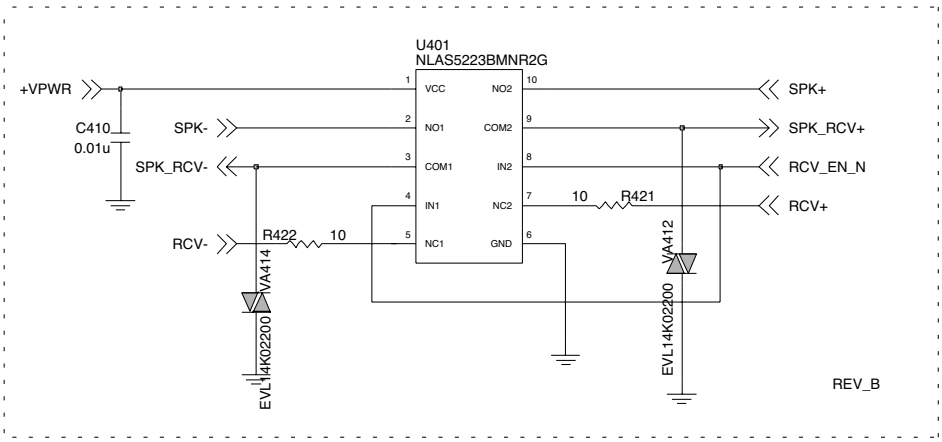


Figure 1.26 Audio part schematics

AUDIO

SELECT_SPK&RCV



MIC

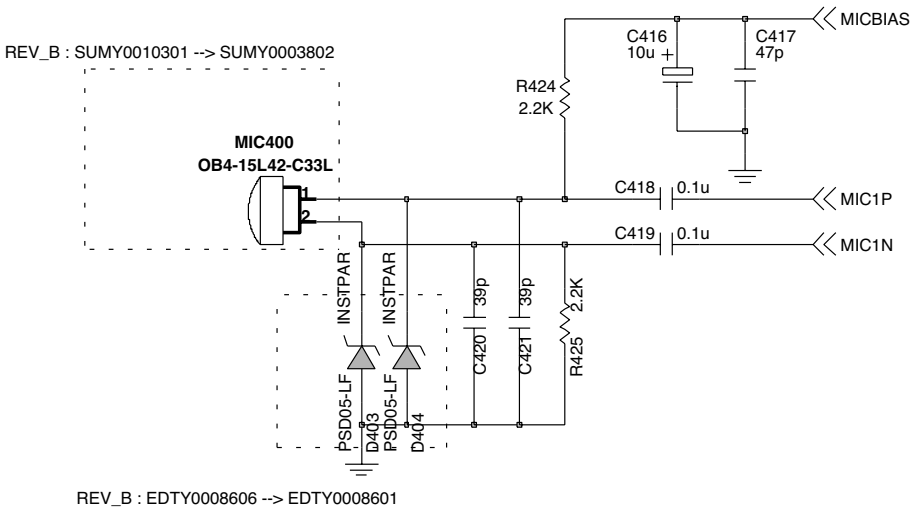
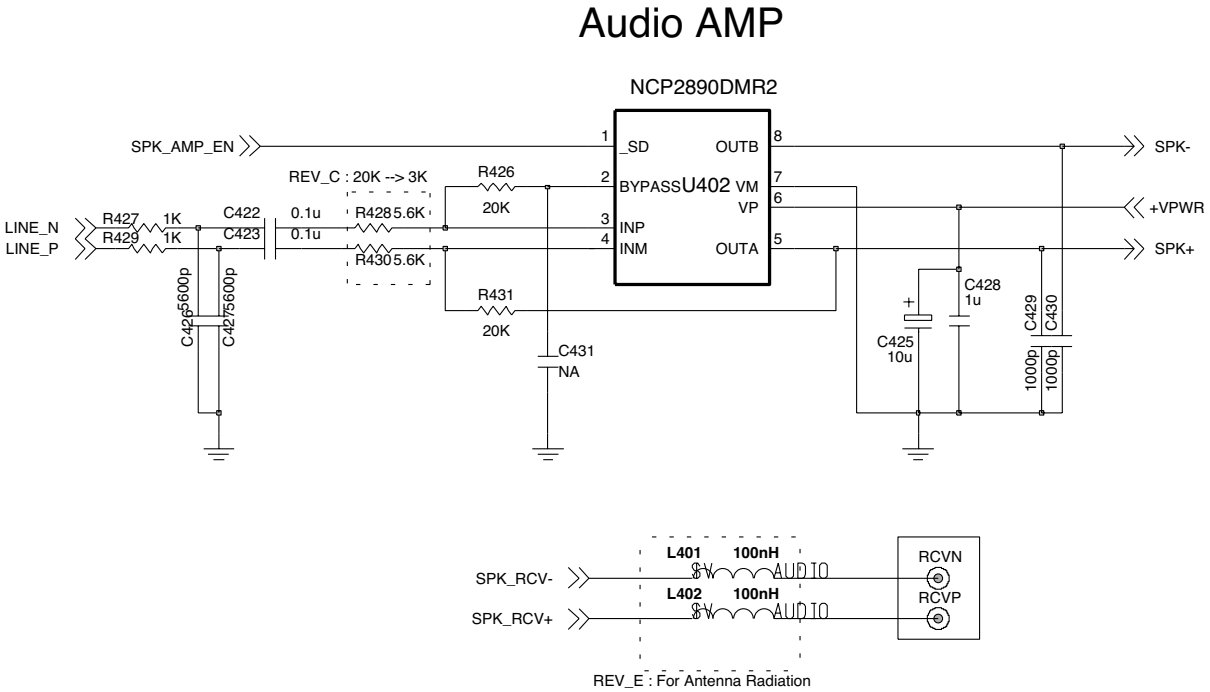


Figure 1.27 Audio part schematics



Audio part schematics

3.11.8.2. Audio Mode

There are three audio modes (Voice call, speaker phone, MIDI/MP3).

MODE	Device	Description
Voice Call	Receiver Mode	Receiver Voice Call
	Loud Mode	Speaker Phone
	Headset	Headset Voice Call
Speaker phone	Loud Mode	Speaker Phone
MIDI	Loud Mode	Speaker MIDI Bell
	Headset	Headset MIDI Bell
MP3	Loud Mode	Speaker MP3
	Headset	Headset MP3

Table. Audio Mode

Audio & Sound Main Component

There are 6 main components in U250/KU250.

	Component	Design No.	Maker Part No.	Note
1	MSM6245	U201	MSM6245	Base-Band Modem
2	Audio amp	U402	NCP2890DMR2	1W Audio Amp
3	Analog Switch	U401	NLAS5223BMNR2G	Dual Analog Switch
4	Speaker/Receiver		EMS1810TP	Speaker/Receiver
5	MIC	MIC400	OB4-15L42-C33L	-42 dB microphone
6	Ear jack		RMBLGG080STSB	Ear jack

Table. Audio main component list

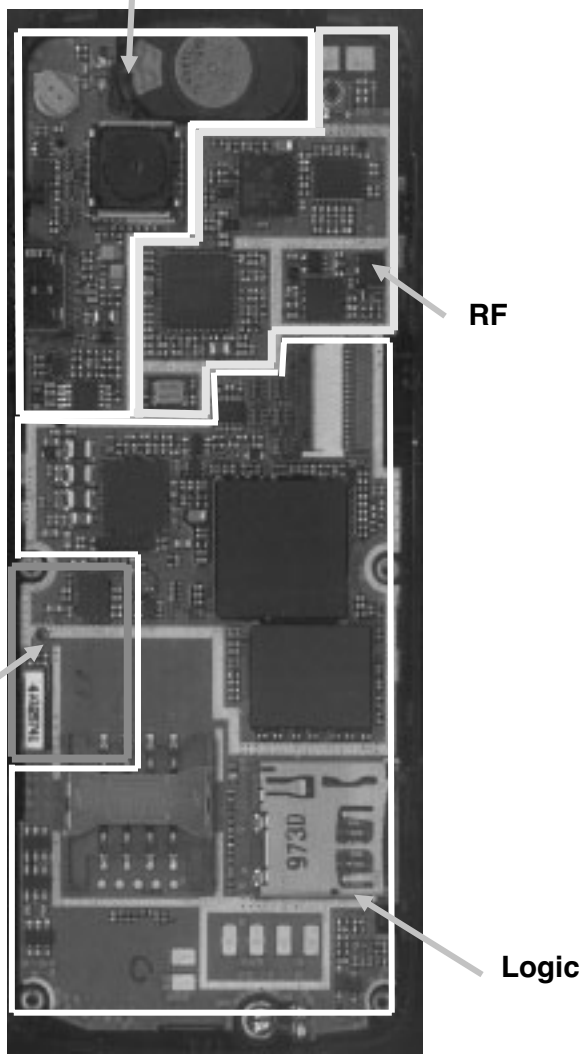
3.12 Main Features

1. LG-U250/KU250 Main features

- Bar Type
- WCDMA(2100) + GSM Tri-Band (900/1800/1900)
- Color LCD (Main:262K TFT, 1.76”)
- Dual Camera (1.3Mega + VGA(0.3M))
- 1810 speaker/receiver
- Stereo Headset
- Speaker phone (in GSM and WCDMA)
- MP3/AAC decoder and play
- MPEG4 encoder/decoder and play/save
- JPEG en/decoder
- Supports Bluetooth, USB
- 950 mAh (Li-Ion)

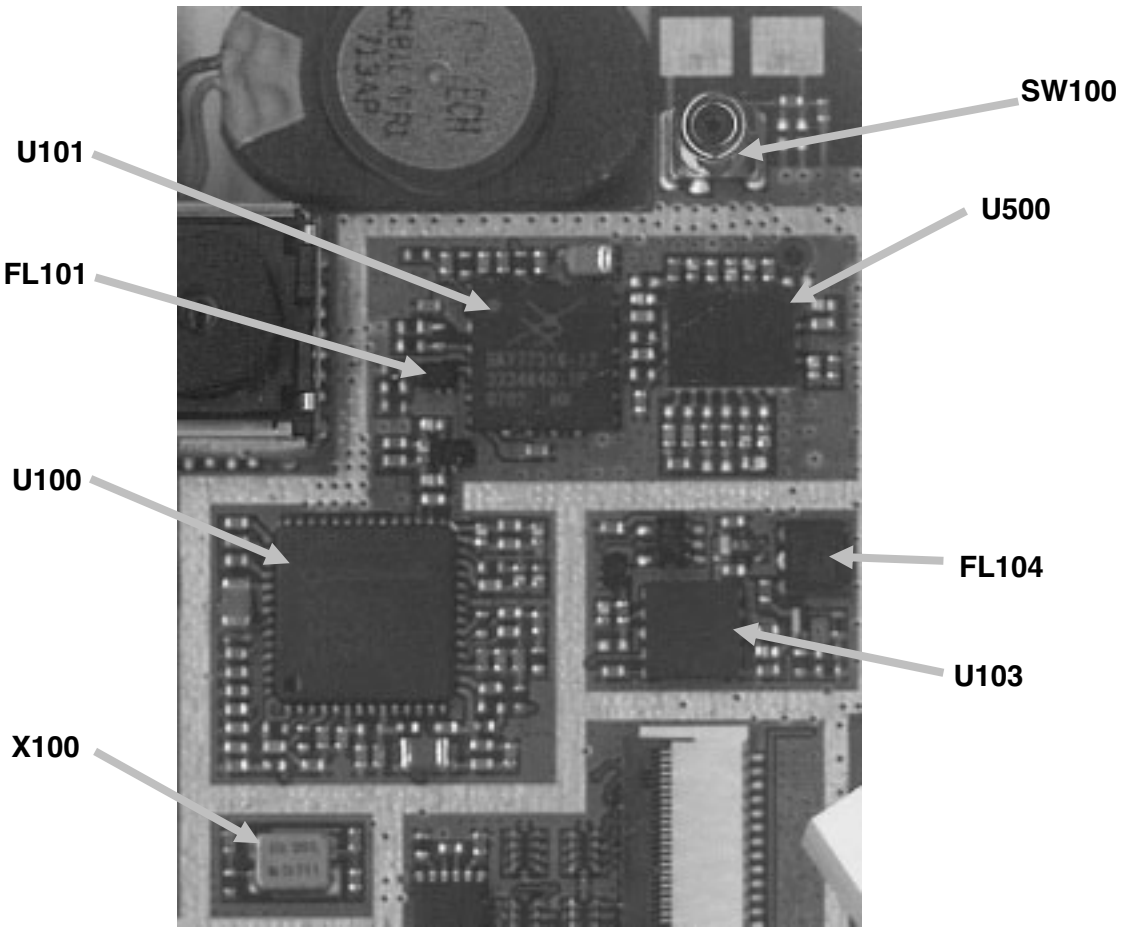
2. U250/KU250 Main Component

Main board (Top)



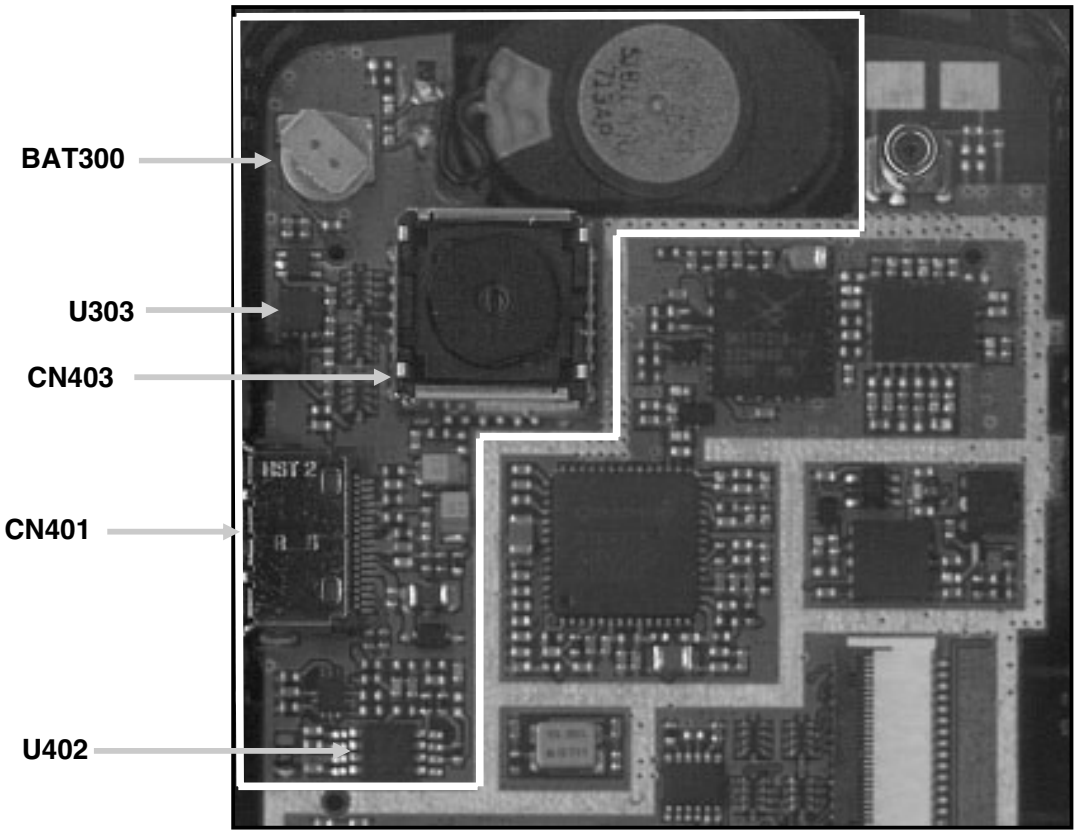
Main board (Bottom)

RF



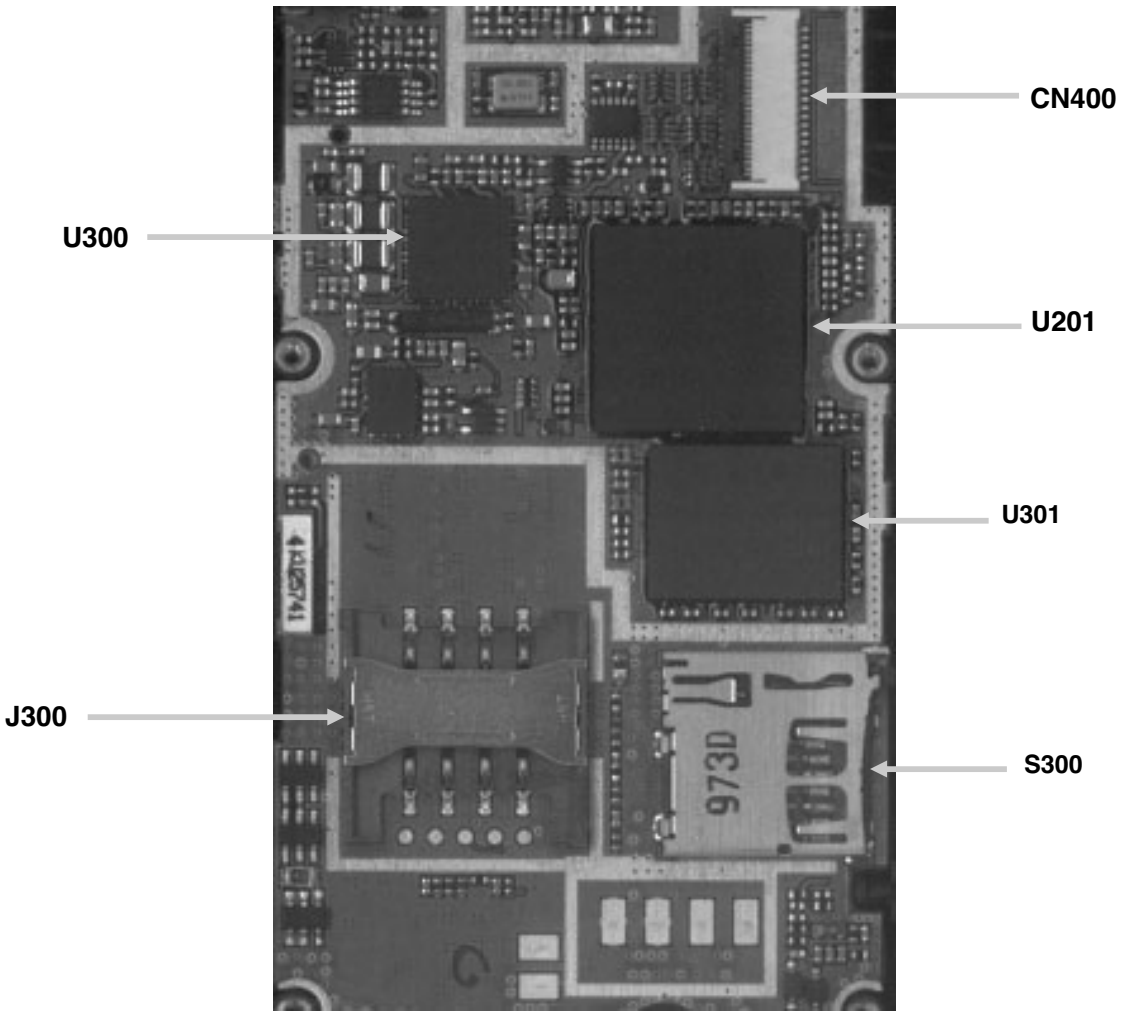
Reference	Description	Reference	Description
SW100	Ant. Switch module	FL104	W2100 Duplex
U500	Front End module	U103	WCDMA PAM
U101	GSM PAM	X100	VCTCXO
FL101	GSM SAW		BT module
U100	RTR6275		

Logic / Audio



Reference	Description	Reference	Description
BAT300	Backup Battery	CN401	MMI connector (18pin)
U303	1.3M Cam. LDO	CN403	1.3M Cam. Connector
U402	Audio AMP		

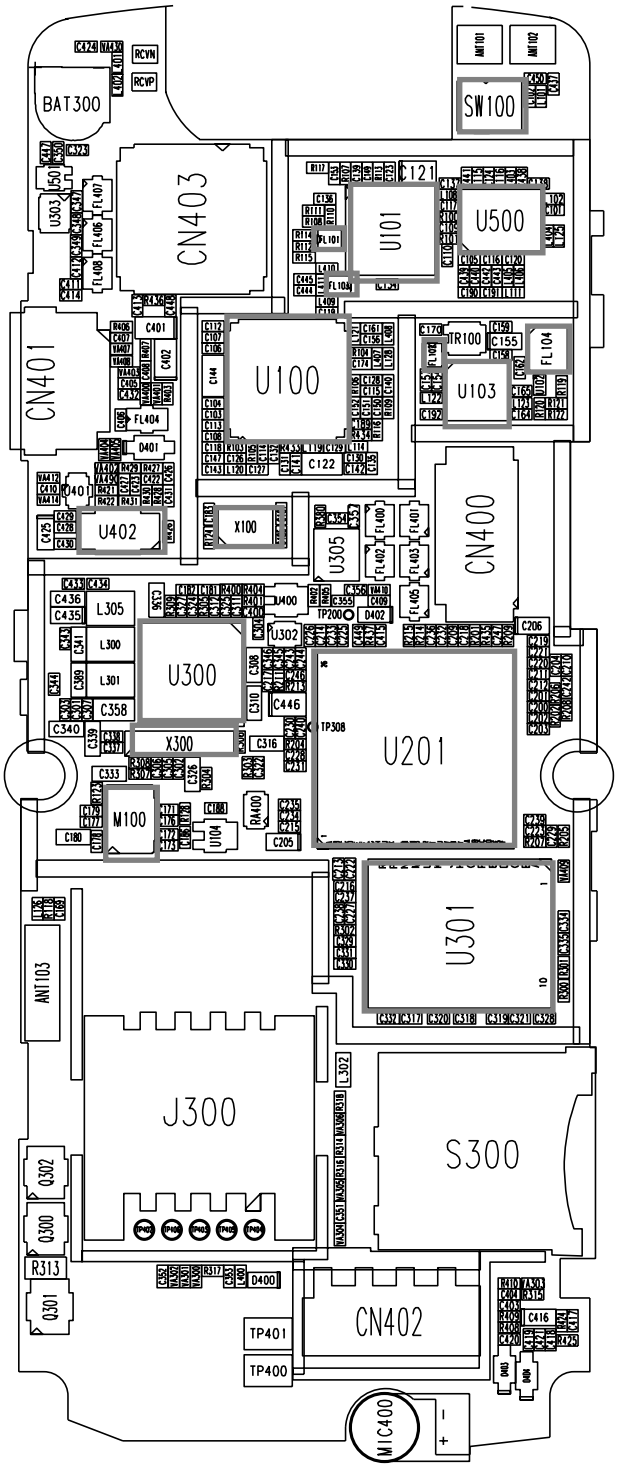
Logic



Reference	Description	Reference	Description
U201	MSM6245_A	U300	PMIC
U301	Memory MCP	J300	U-SIM socket
CN400	Main To LCD Connector	S300	T-FLASH socket

4. TROUBLE SHOOTING

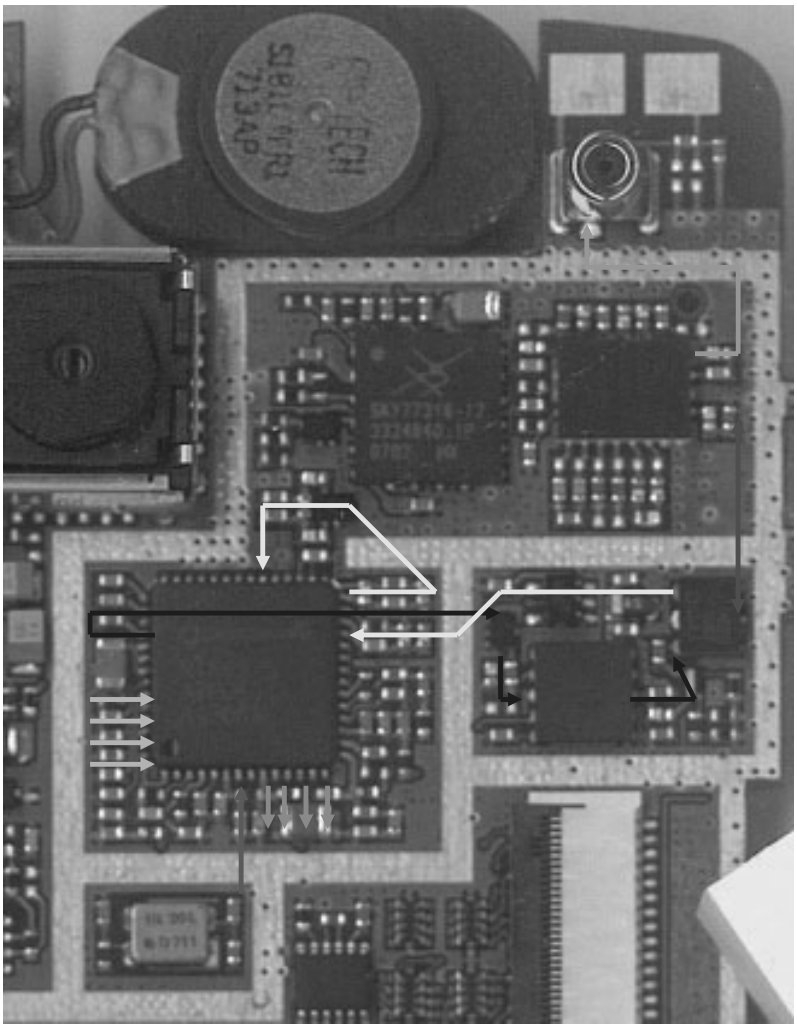
4.1 RF Component



4. TROUBLE SHOOTING

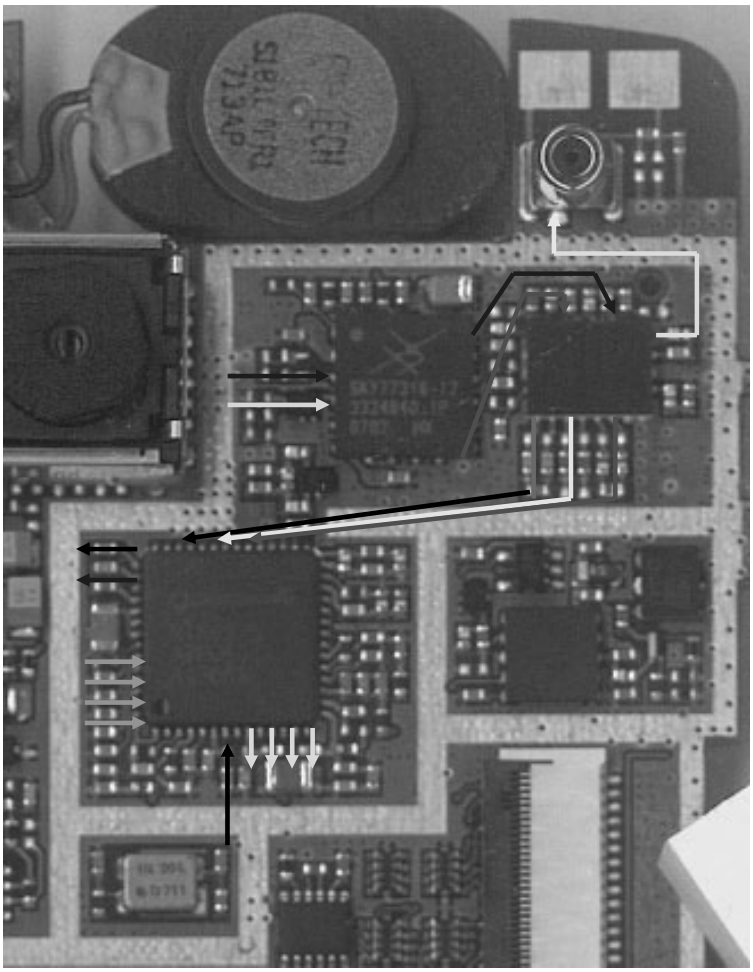
Block Diagram Block	Ref. Name	Part Name	Function	Comment
Common	U201	MSM6245	Main Control	Main Chipset
	X300	MC-146_7pF	Sleep Clock	32.768 kHz
	U300	PM6650-2M	Power Control	Power Supply
	U402	NCP2890D MR2G	Speaker AMP	AMP
	U500	D5011	Switch	Band select
	U301	HYC0UEH0 MF3P	Memory	512M/512M
	SW100	KMS-507	Test Connector	Calibration, etc
	X100	DSA321SCE-19.2MHz	VCTCXO	19.2MHz
Bluetooth	M 100	LBRQ-2B43A	Bluetooth RF Transceiver	Bluetooth TRX
UMTS	U100	RTR6275	UMTS/GSM Transceiver	TRX
	FL103	EFCH2140T DE1	UMTS2100 RX SAW filter	RX
	FL104	ACMD-7602	UMTS 2100 Duplexer	TRX
	U103	W S2512-TR1G	UMTS PA	TX
	FL102	EFCH1950T DF1	UMTS 2100 TX SAW Filter	TX
GSM	U101	SKY77318	TX Dual PAM	TX
	FL101	EFCH897 MTDB1	GSM900 TX SAW Filter	TX

4.2 SIGNAL PATH_UMTS RF



Common Tx/Rx
UMTX 2100 Tx/Rx
UMTX 2100 Tx
UMTX 2100 Rx
Tx I/Q
LO
RX I/Q

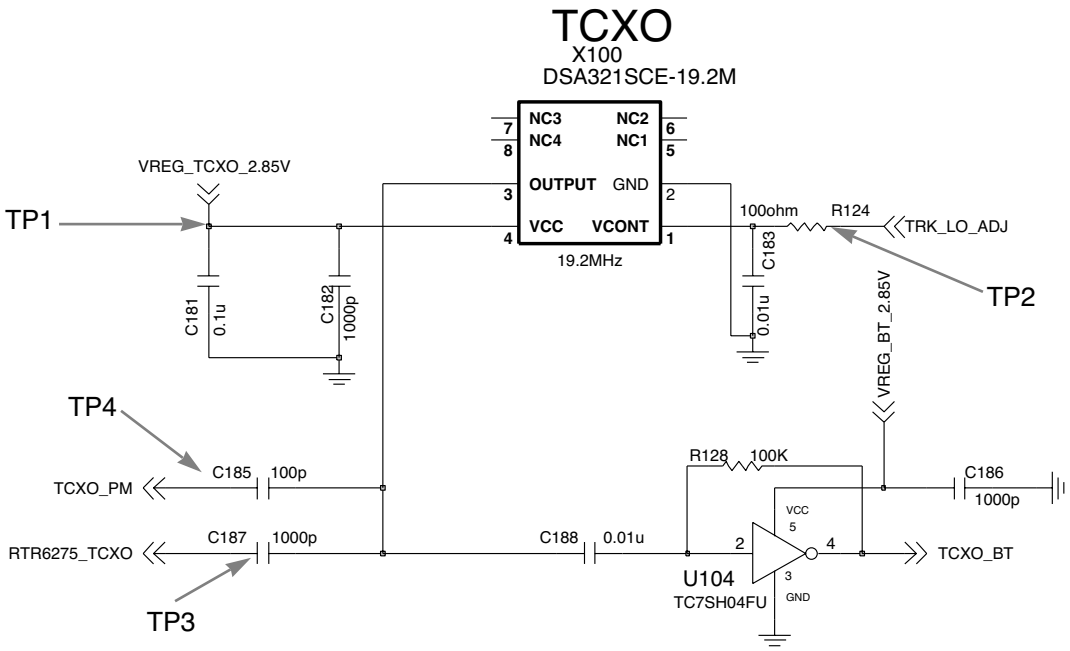
4.3 SIGNAL PATH_GSM RF



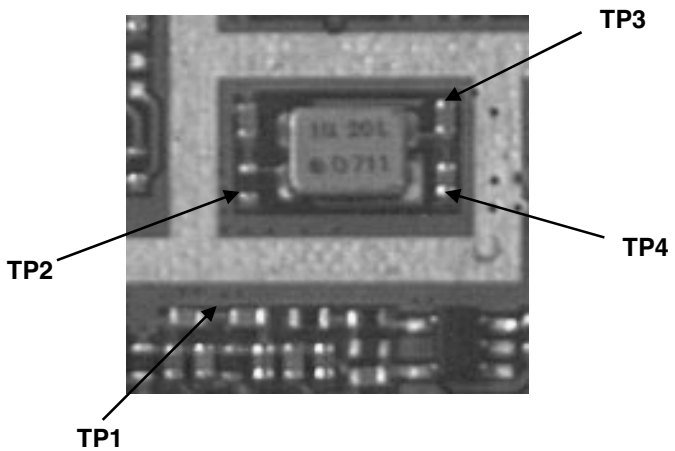
Common Tx/Rx
GSM900 Tx
DCS/PCS Tx
EGSM900 RX
PCS Rx
DCS RX
Tx I/Q
LO
RX I/Q

4.4 Checking VC-TCXO Block

The reference frequency (19.2MHz) from X100 (VC-TCXO) is used in UMTS TX part, GSM part and BB part.

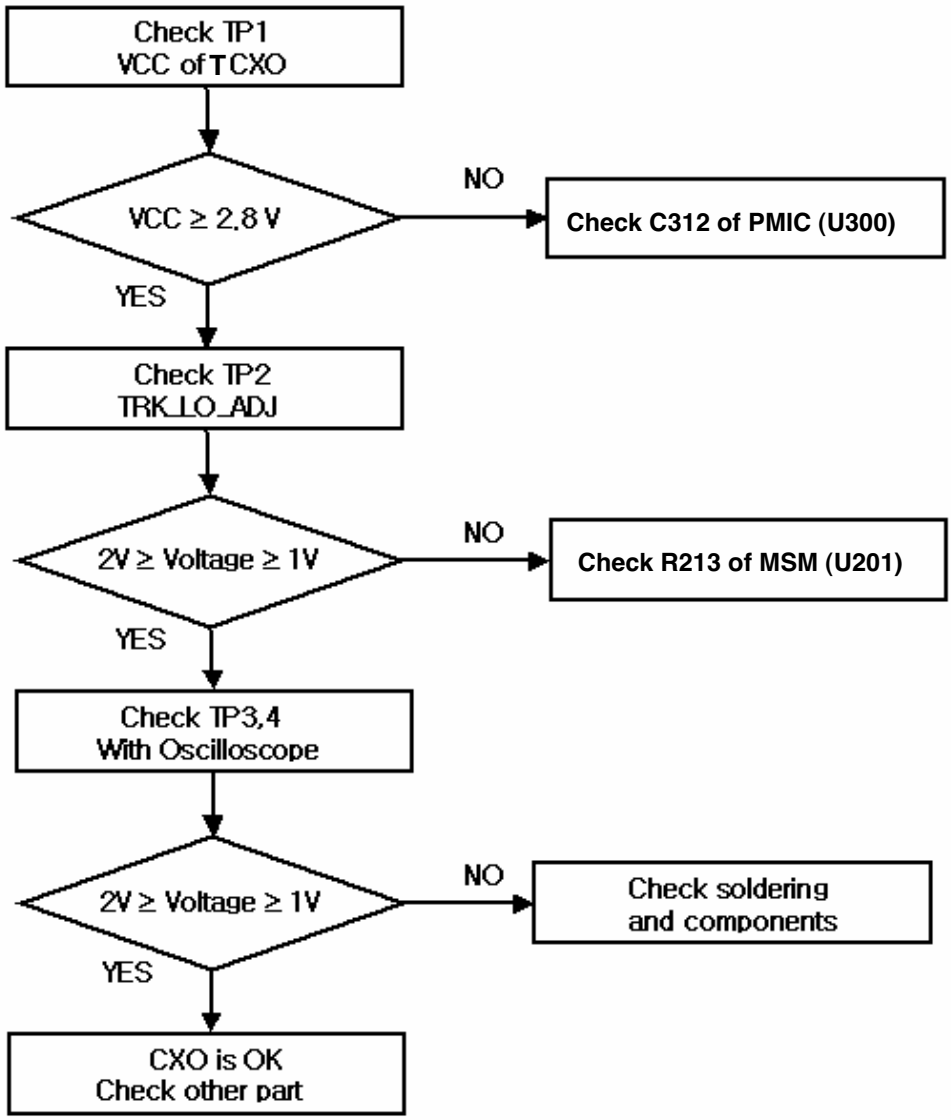


Schematic of the VC-TCXO Block

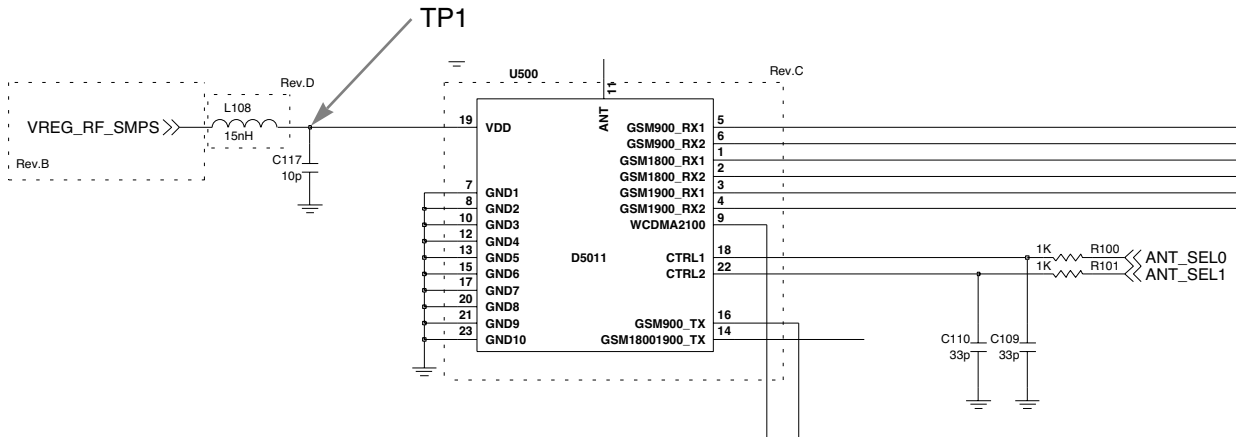


Test Point of the VC-TCXO Block

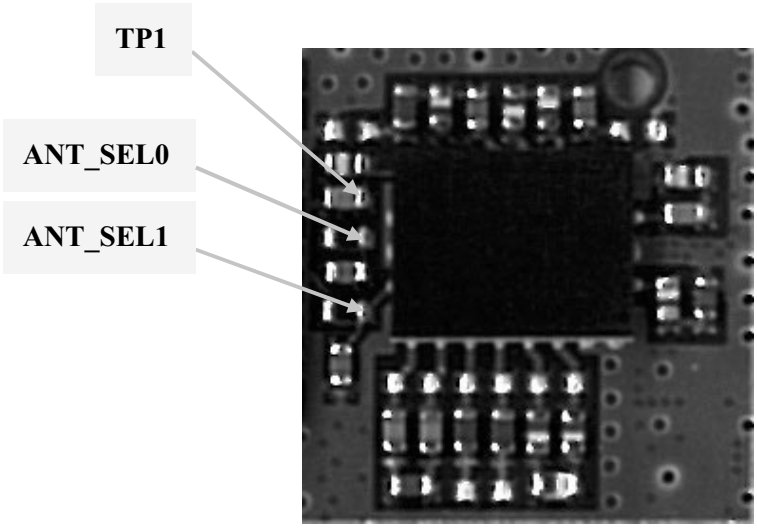
4. TROUBLE SHOOTING



4.5 Checking Front-End Module Block



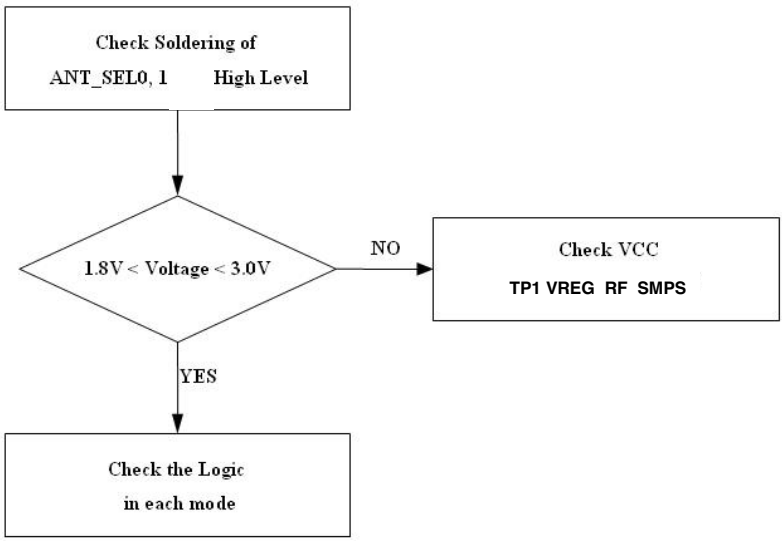
Schematic of the Front-End Module Block



Test Point of the Front-End Module Block

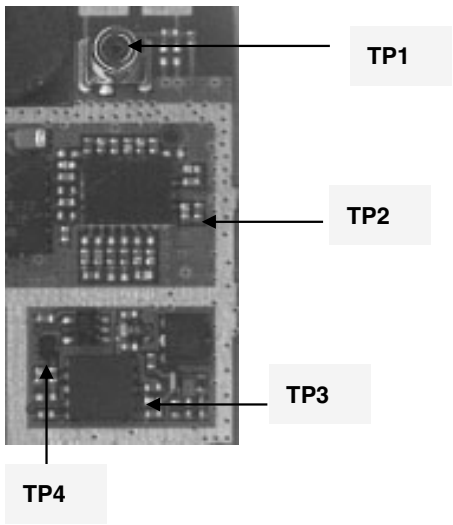
Logic Table of the FEM

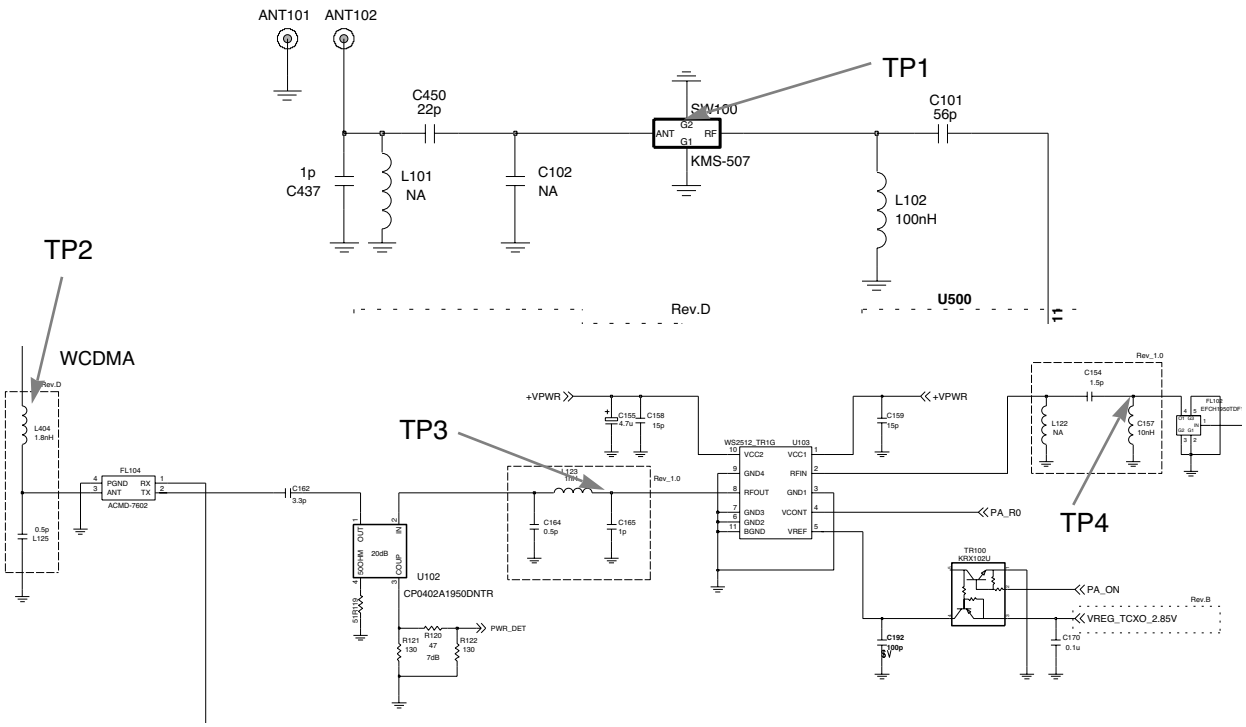
	ANT_SEL0	ANT_SEL1
GSM 1800 / GSM1900 RX	LOW	LOW
GSM 900 RX	HIGH	LOW
GSM 900 TX / WCDMA	LOW	HIGH
GSM 1800 / GSM 1900 TX	HIGH	HIGH



4.6 Checking UMTS Block

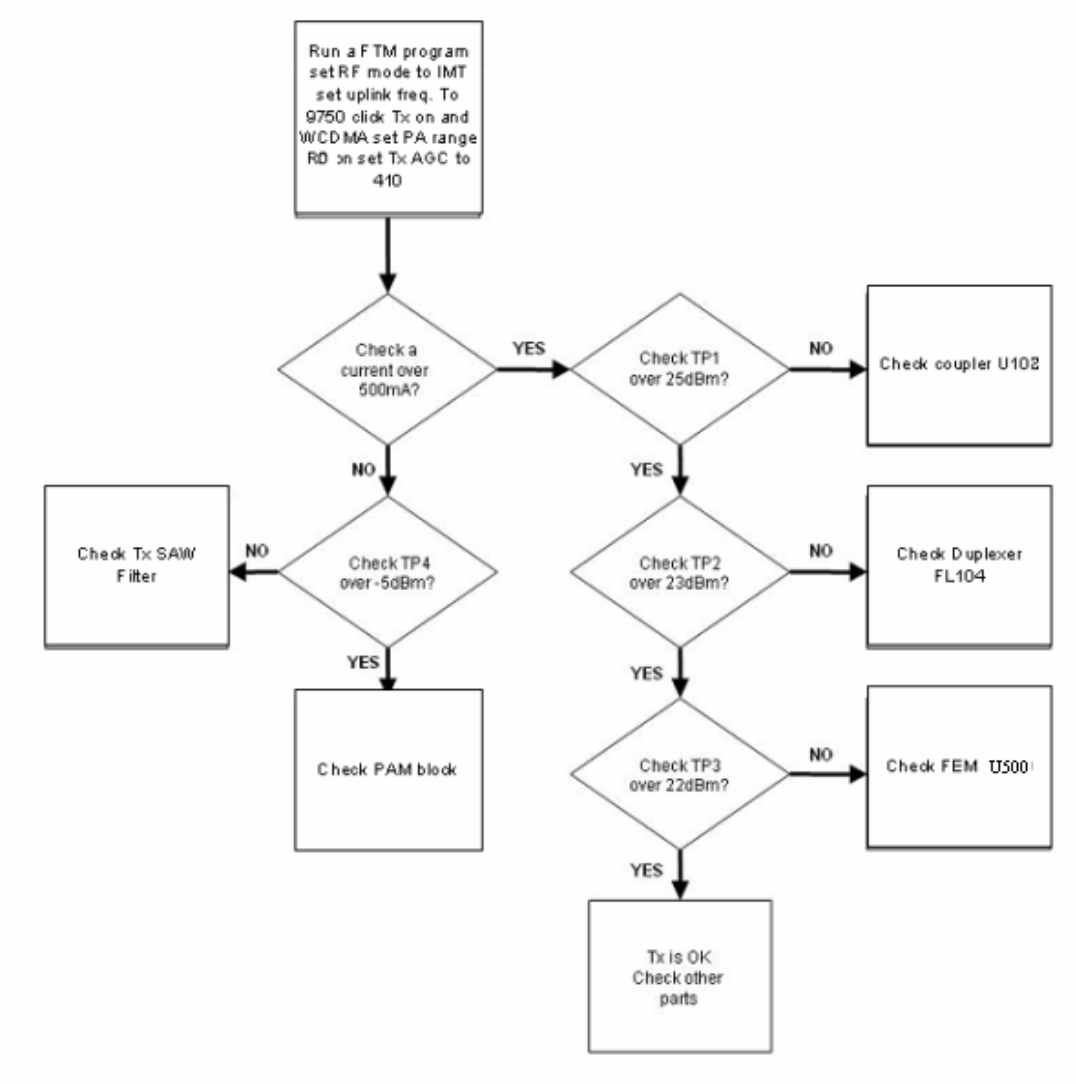
4.6.1 Checking Tx level





For testing, Max power of UMT 2100 is needed.

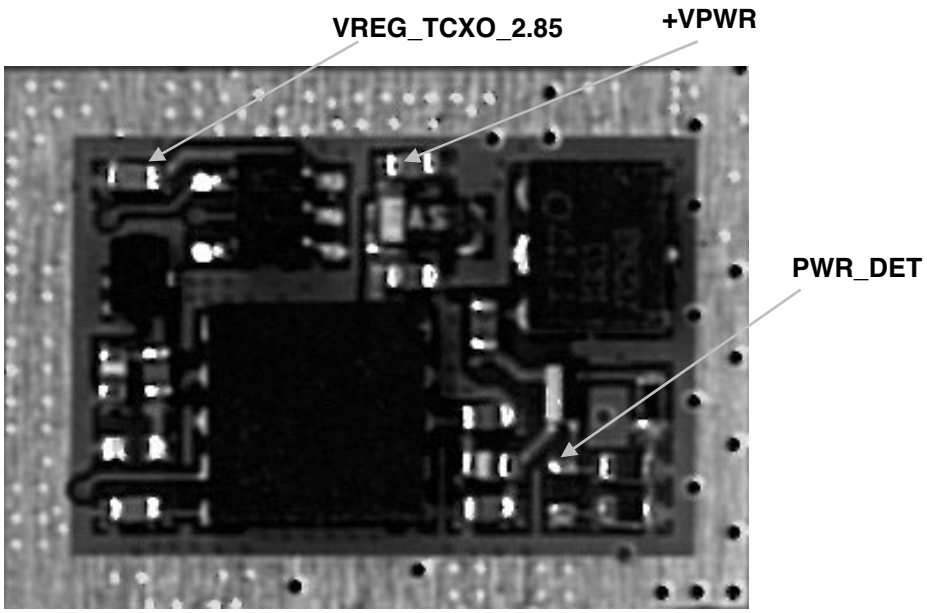
4. TROUBLE SHOOTING



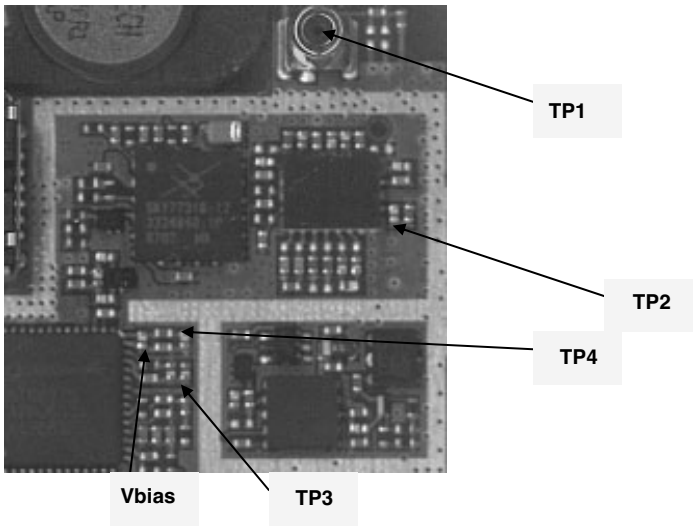
4.6.2 Checking UMTS PAM Control Block

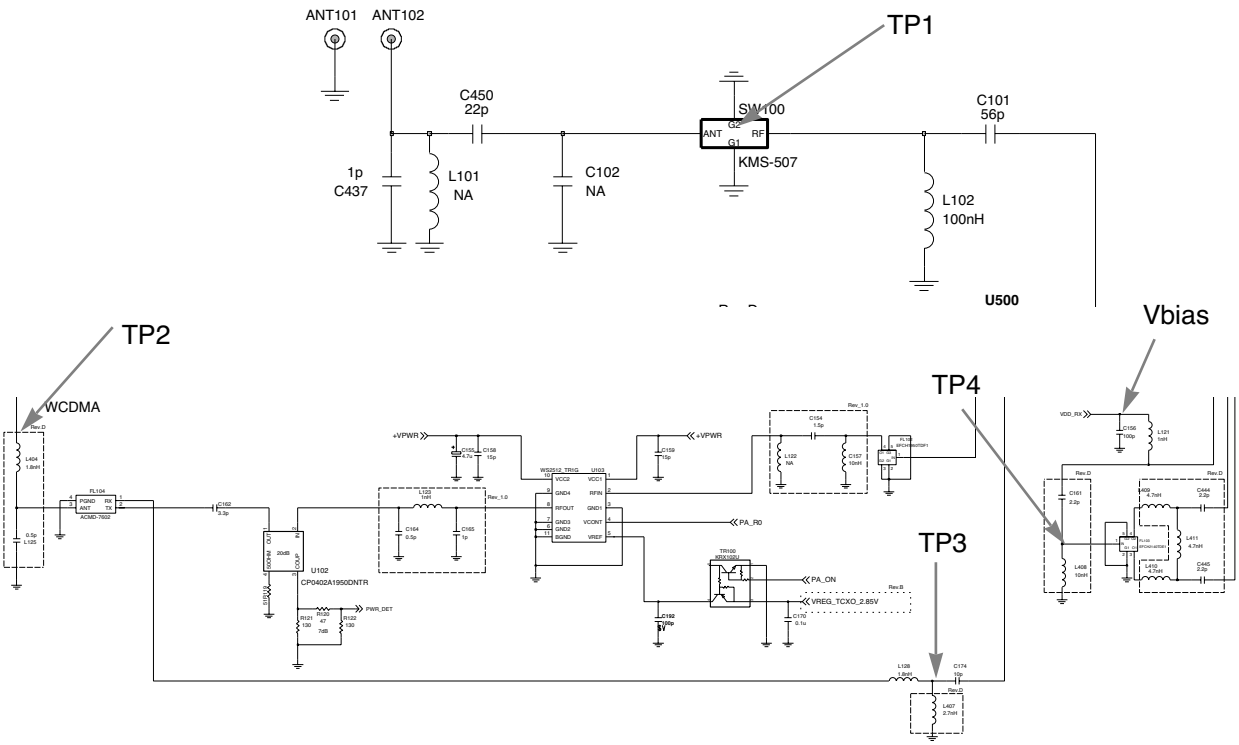
• PAM control signal

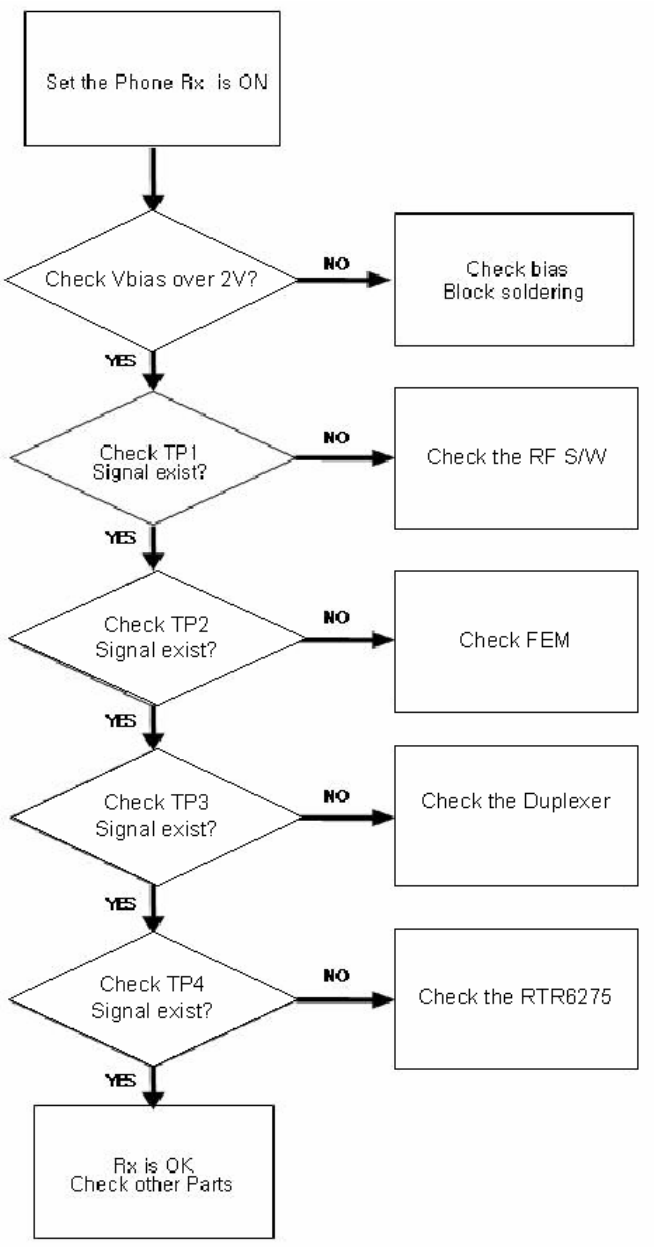
1. PWR_DET : UMTS Tx Power Detected value (Check R120)
2. TX_AGC_ADJ : UMTS RTR6275 Tx Amp Gain Control
3. VREG_TCXO_2.85V : UMTS PAM enable (C170) (about 2.85V)
4. +VPWR : UMTS PAM Main Voltage (3V < +VPWR < 4.2V)
5. PA_ON : Turns the PA on and off
6. PA_R0 : Control signals that step the active PA mode and bias



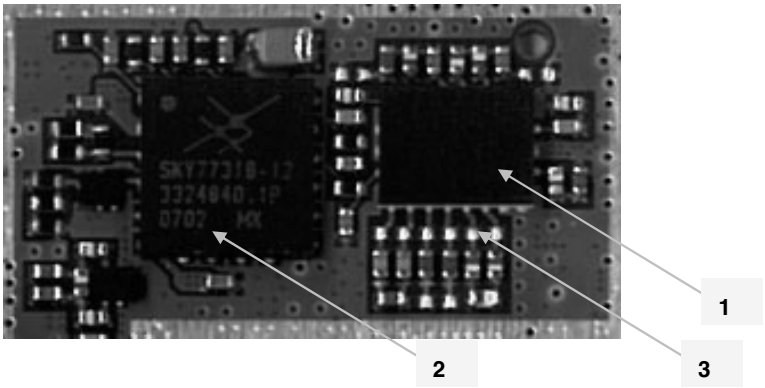
4.6.3 Checking RF Rx Level

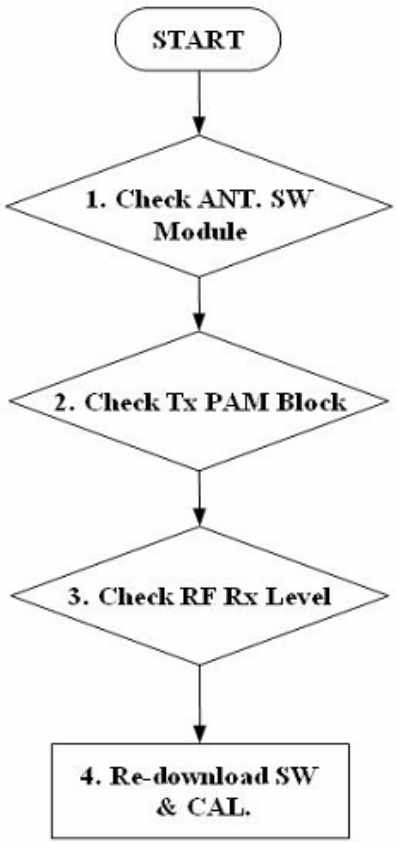




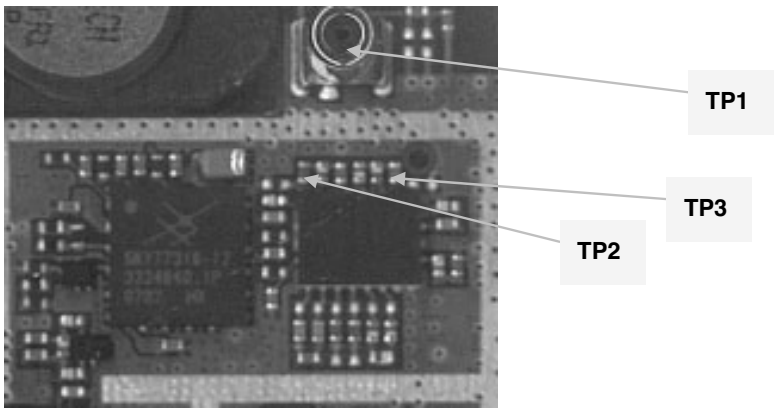

Set the Phone Rx is ON
Check Vbias over 2V?
NO
Check bias
Block soldering
YES
Check TP1
Signal exist?
NO
Check the RF S/W
YES
Check TP2
Signal exist?
NO
Check FEM
YES
Check TP3
Signal exist?
NO
Check the Duplexer
YES
Check TP4
Signal exist?
NO
Check the RTR6275
YES
Rx is OK
Check other Parts

4.7 Checking GSM Block

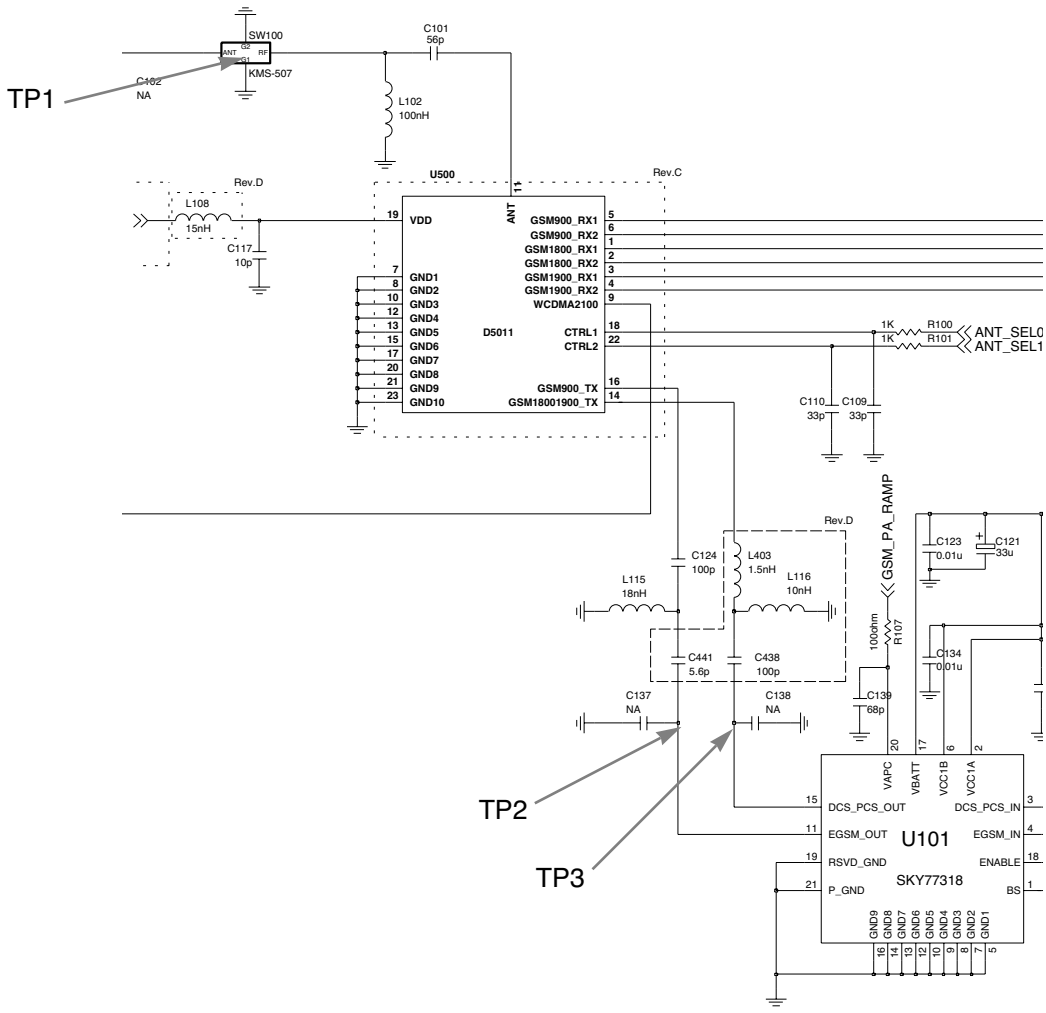




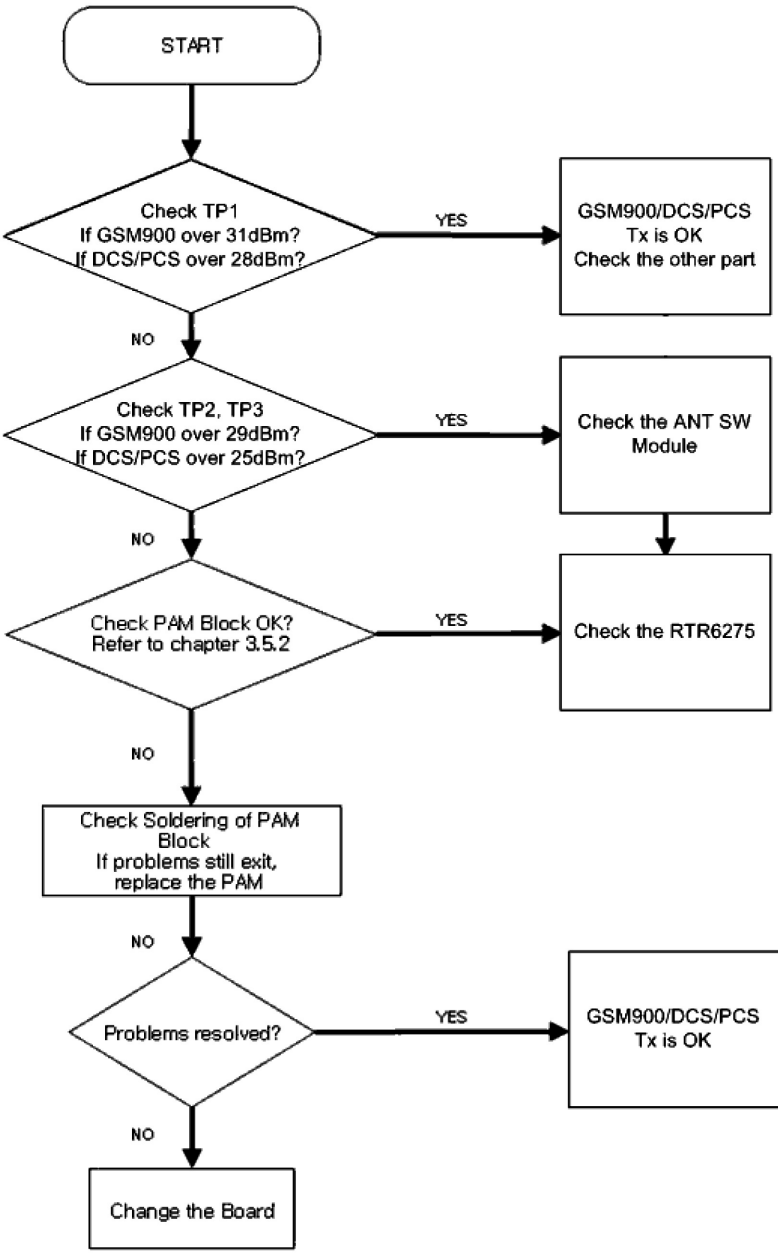
4.7.1 Checking RF Tx level



4.7.2 Schematic of RF Tx level

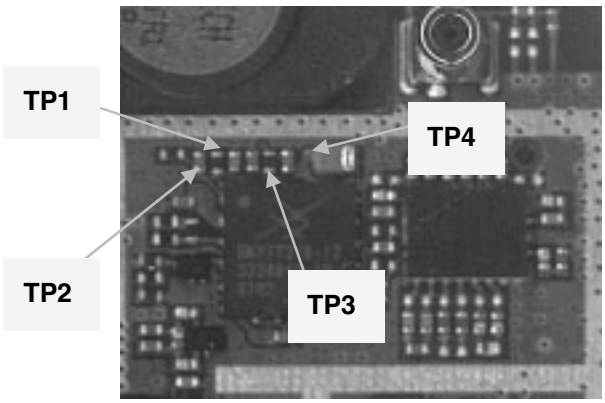


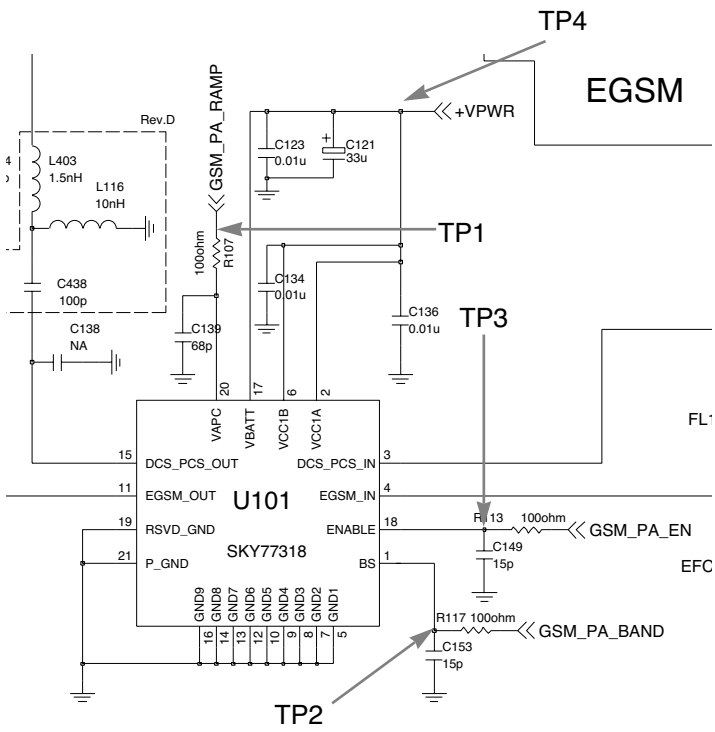
4.7.3 Checking RF Tx level



4.7.4 Checking PAM Block

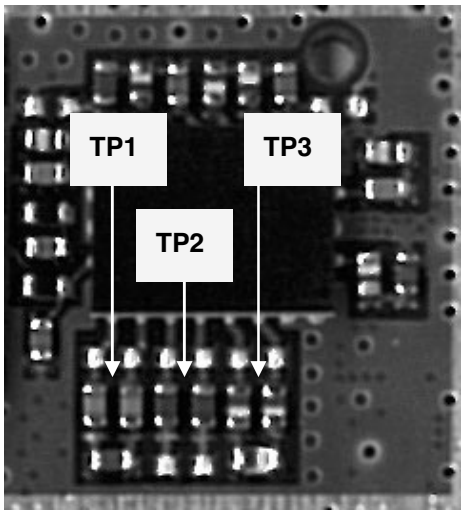
TP1. GSM_PA_RAMP : Power Amp Gain Control. typically, 0.2V < Vramp < 1.6V
TP2. GSM_PA_EN : Power Amp Enable
(Power ON : higher than 1.25V , Power OFF : lower than 0.4V)
TP3. GSM_PA_BAND : Power Amp Band Selection Control
(GSM Mode : -0.2V < VBS < 0.4V , DCS/PCS Mode : 1.25V < VBS < 3.0V)
TP4. +VPWR : PAM Supply Voltage Vcc higher than 3.0V



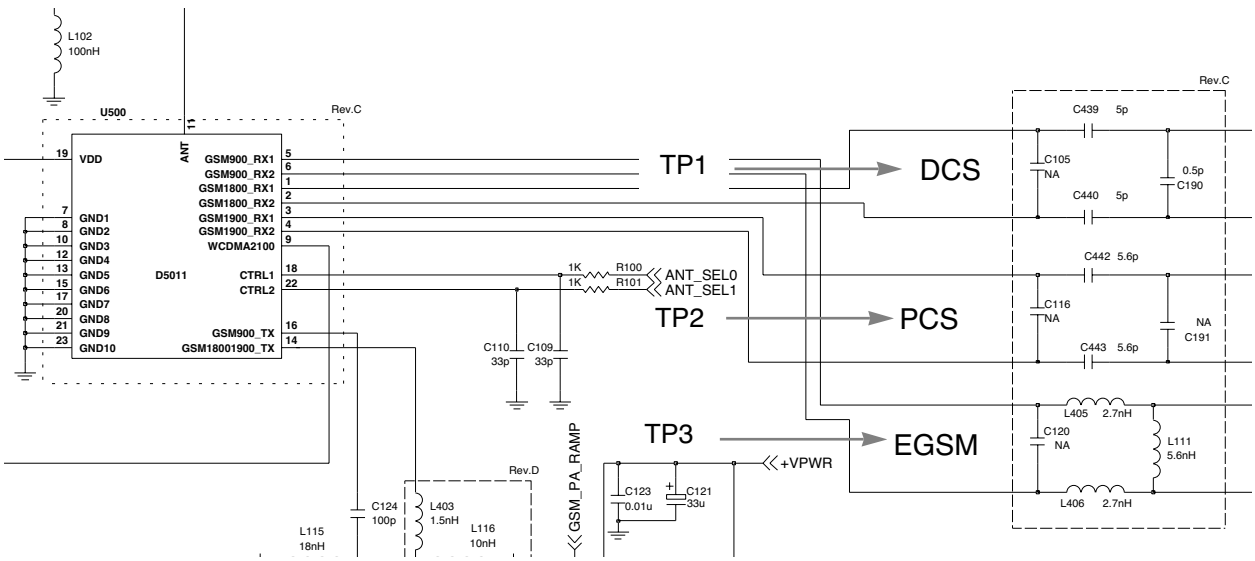


Schematic of GSM PAM Block

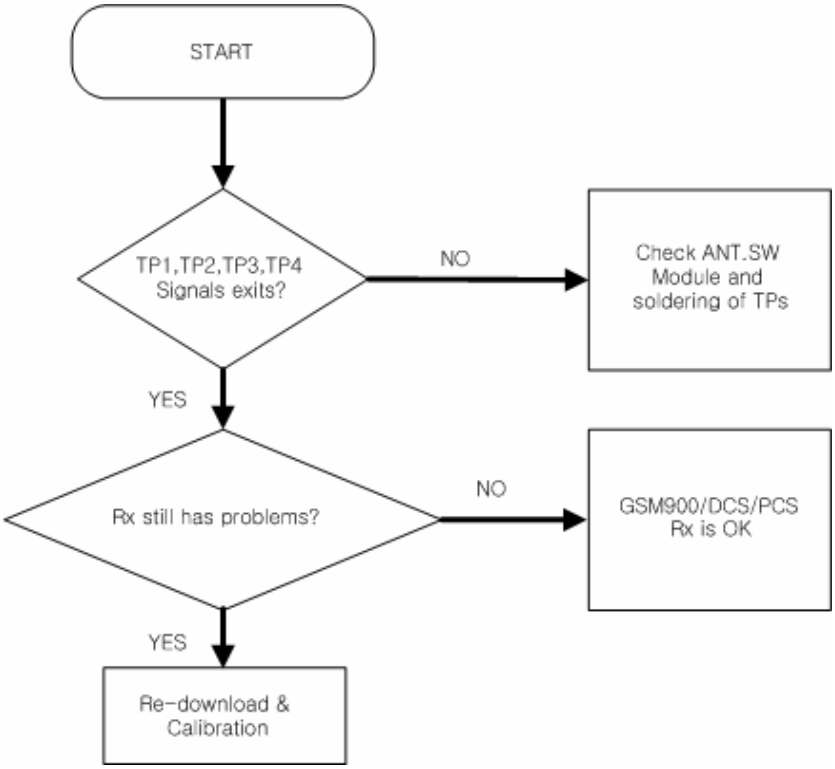
4.7.5 Checking RF Rx Block



TP1. DCS RX INPUT
TP2. PCS RX INPUT
TP3. GSM RX INPUT

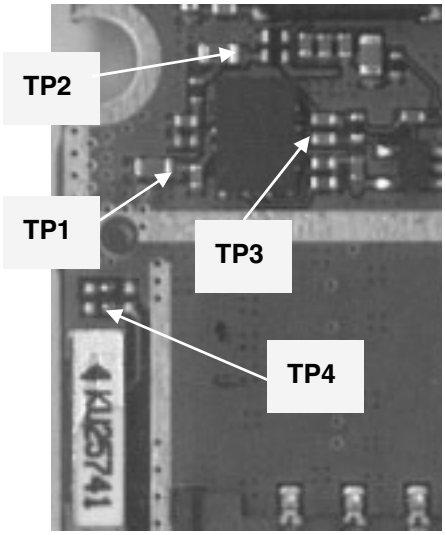


Schematic of GSM900/DCS/PCS Rx Block


START
TP1,TP2,TP3,TP4
Signals exits?
NO
Check ANT.SW
Module and
soldering of TPs
YES
Rx still has problems?
NO
GSM900/DCS/PCS
Rx is OK
YES
Re-download &
Calibration

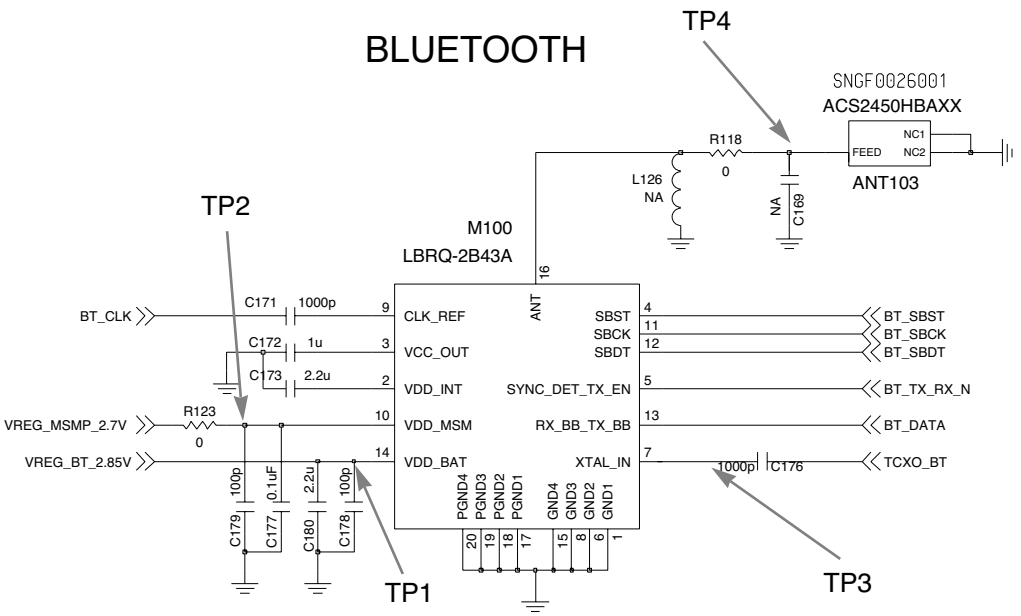
4.8 Checking Bluetooth Block

Test Point of the Bluetooth Block

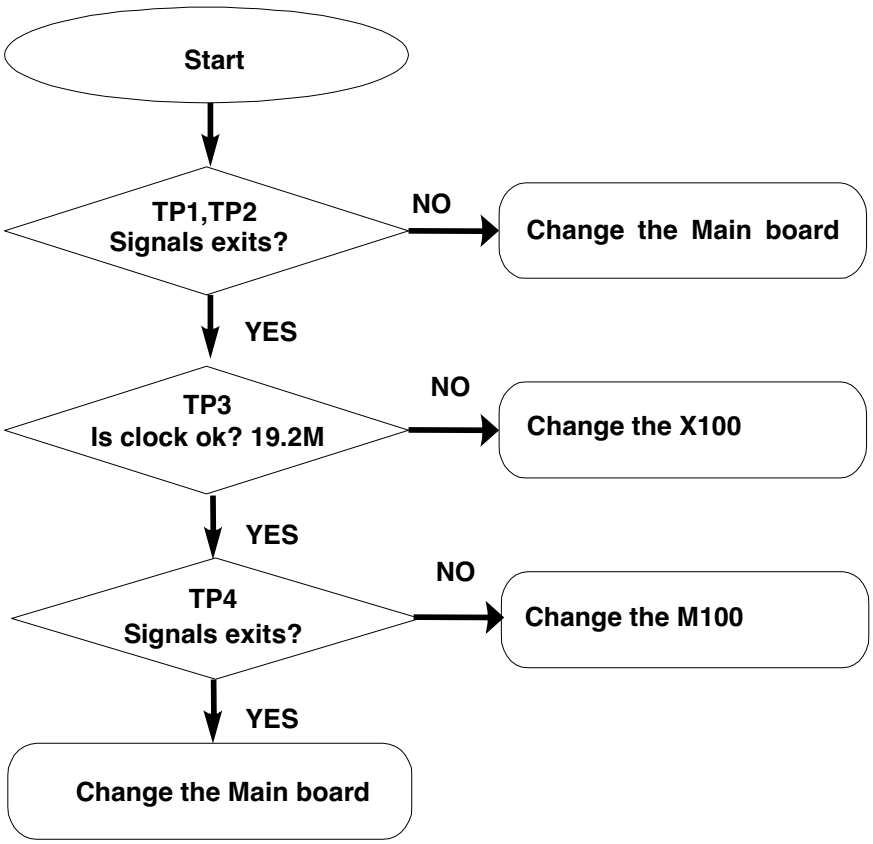


TP1. VREG_BT_2.85V
TP2. VREG_MSMP_2.7V
TP3. TCXO_BT
TP4. BT ANT Output

Test Point of the Bluetooth Block



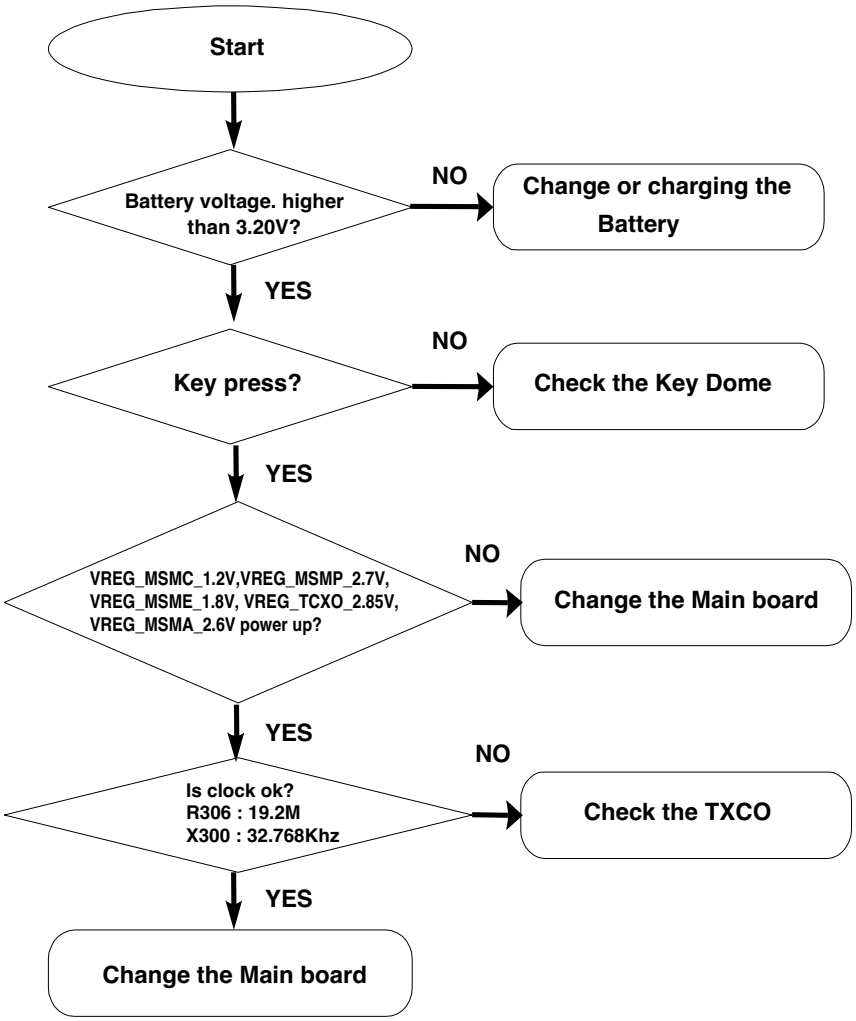
Schematic of the Bluetooth Block

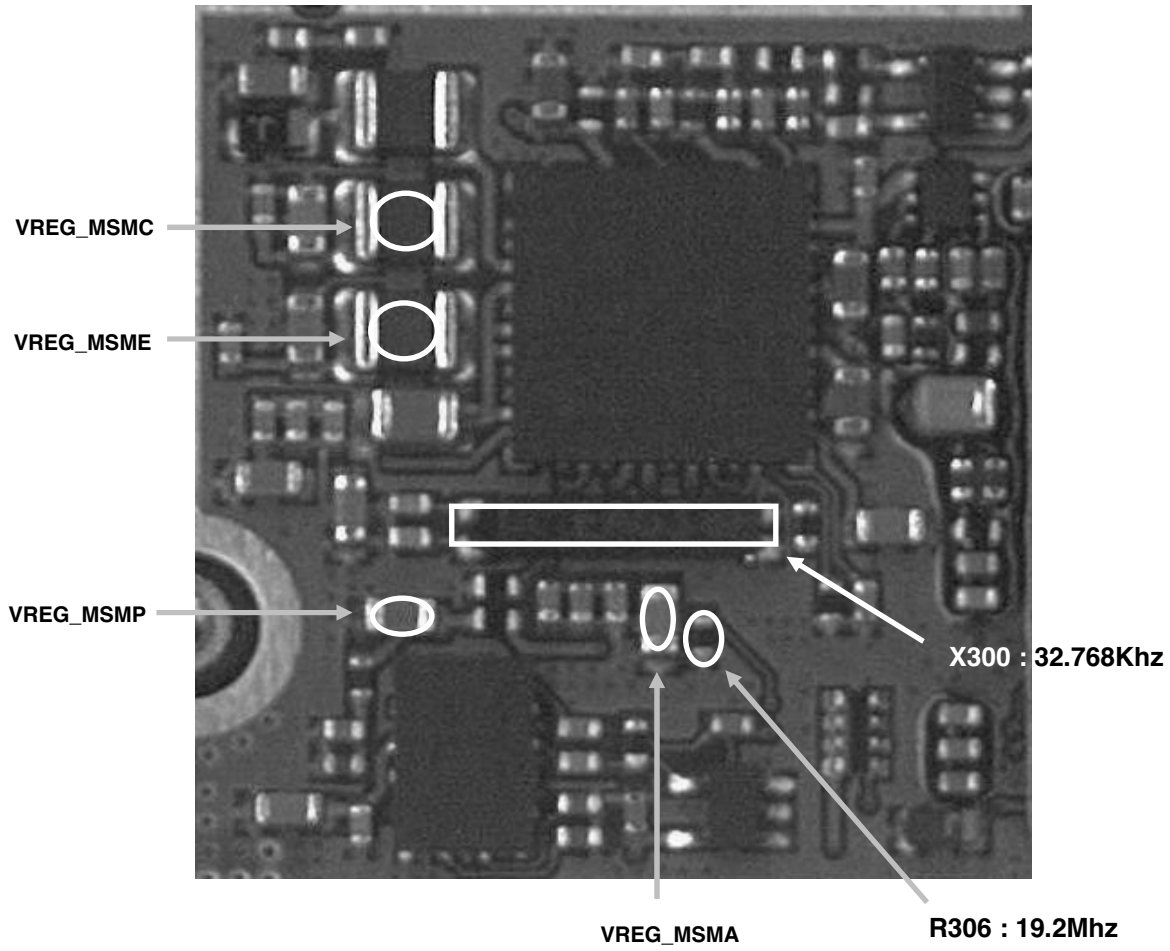

Start
TP1,TP2
Signals exits?
NO
Change the Main board
YES
TP3
Is clock ok? 19.2M
NO
Change the X100
YES
TP4
Signals exits?
NO
Change the M100
YES
Change the Main board

4.9 Power ON Troubleshooting

Power On sequence of U250/KU250 is :

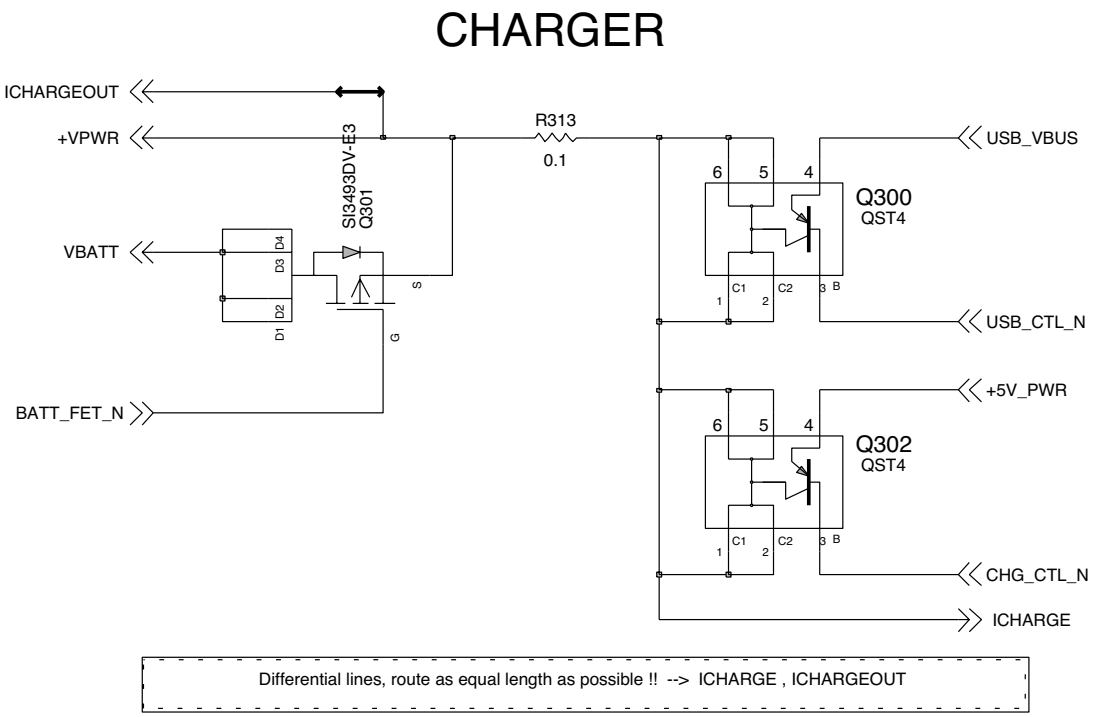
PWR key press → PM_ON_SW_N go to low, PM6650 KPDPWR_N (pin24) → PM6650 Power Up → VREG_MSMC_1.2V, VREG_MSME_1.8V, VREG_MSMP_2.7V, VREG_MSMA_2.6V, VREG_TCXO_2.85V power up and system reset assert to MSM6245 → Phone booting and PS_HOLD assert to PMIC





[U250/KU250 Main PCB BOTTOM]

4.10 Charger Troubleshooting



Charging Procedure

- Connect TA or USB Cable
- Control the charging current by PM6650 IC
- Charging current flows into the battery

Troubleshooting Setup

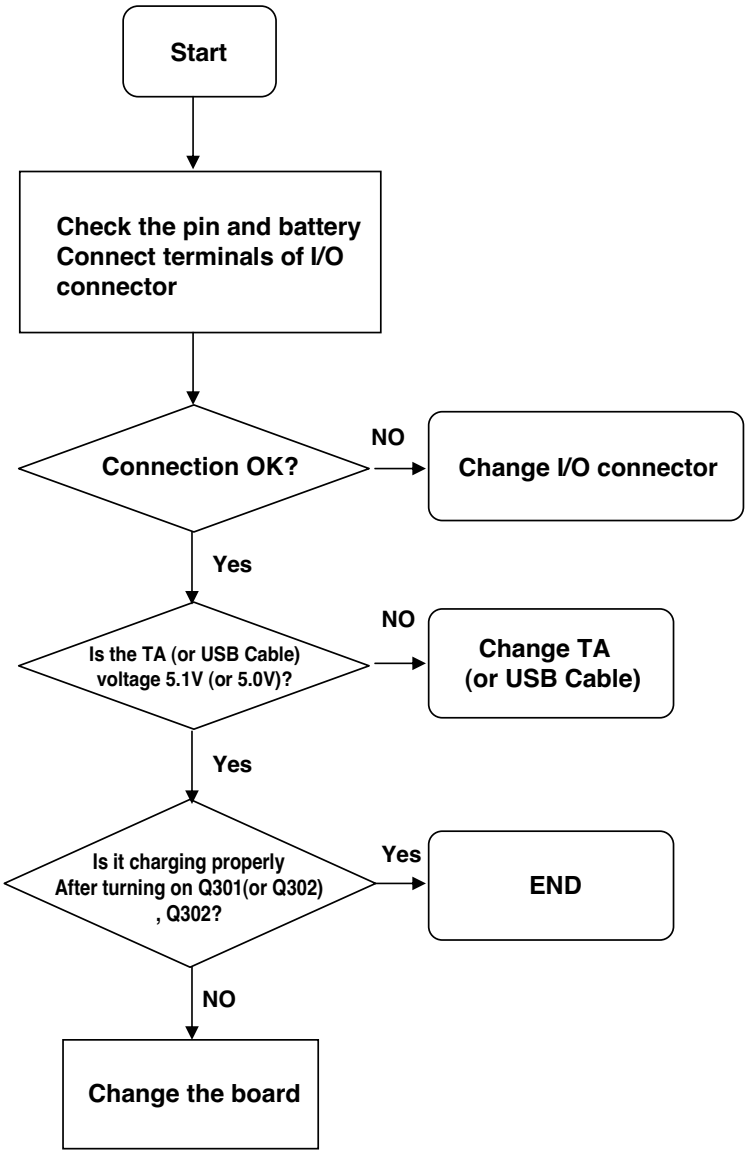
- Connect TA and battery to the phone

Check Point

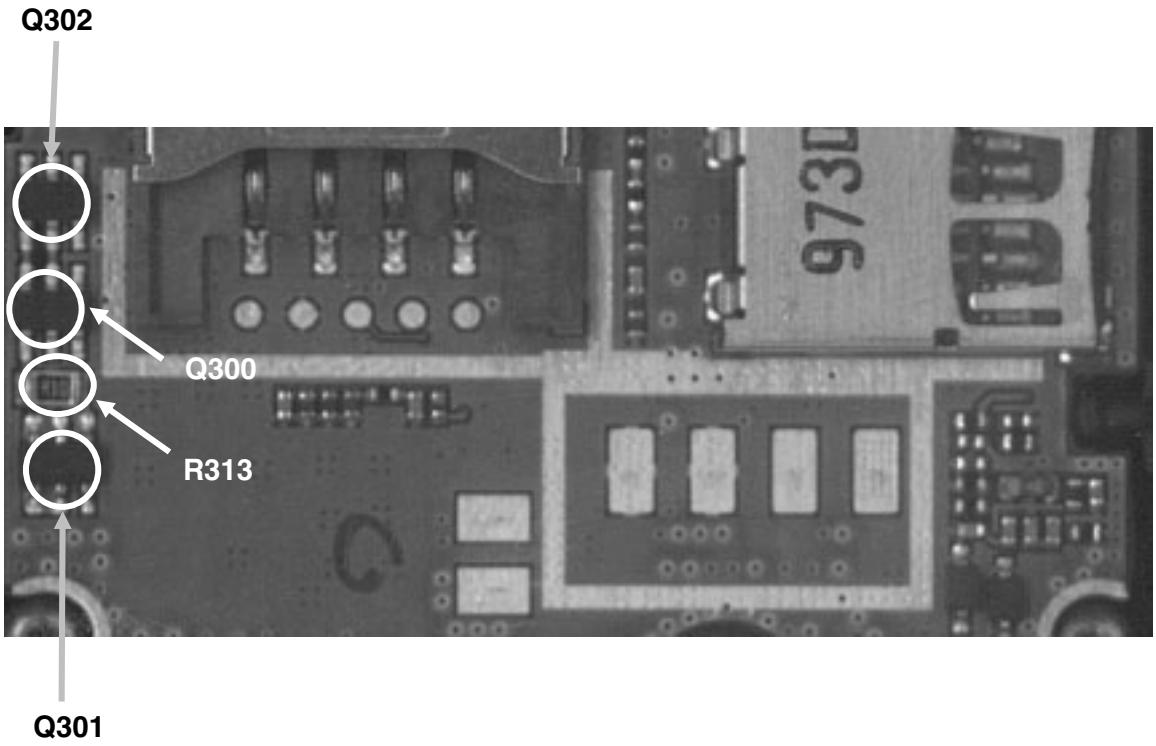
- Connection of TA or USB Cable
- Charging current path
- Battery

Troubleshooting Procedure

- Check the charger (TA or USB Cable) connector
- Check the charging current Path
- Check the battery



[Charger Troubleshooting Flow]

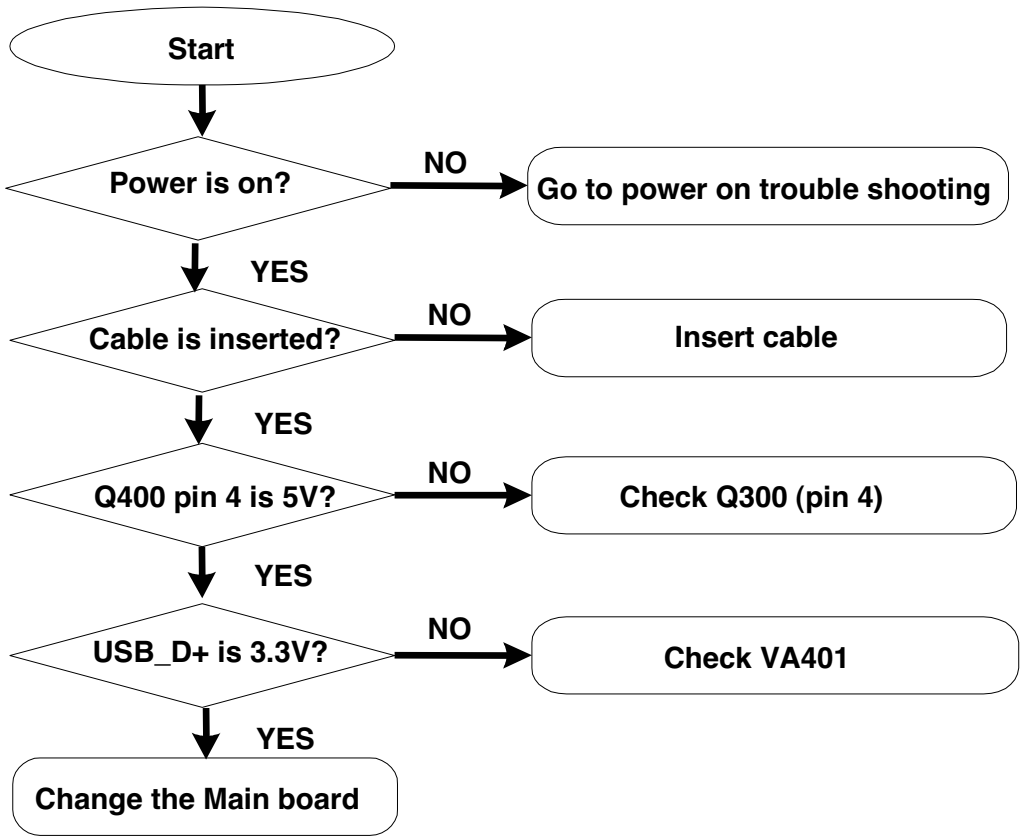


[Charging part (Main PCB Front)]

4. BB Trouble Shooting

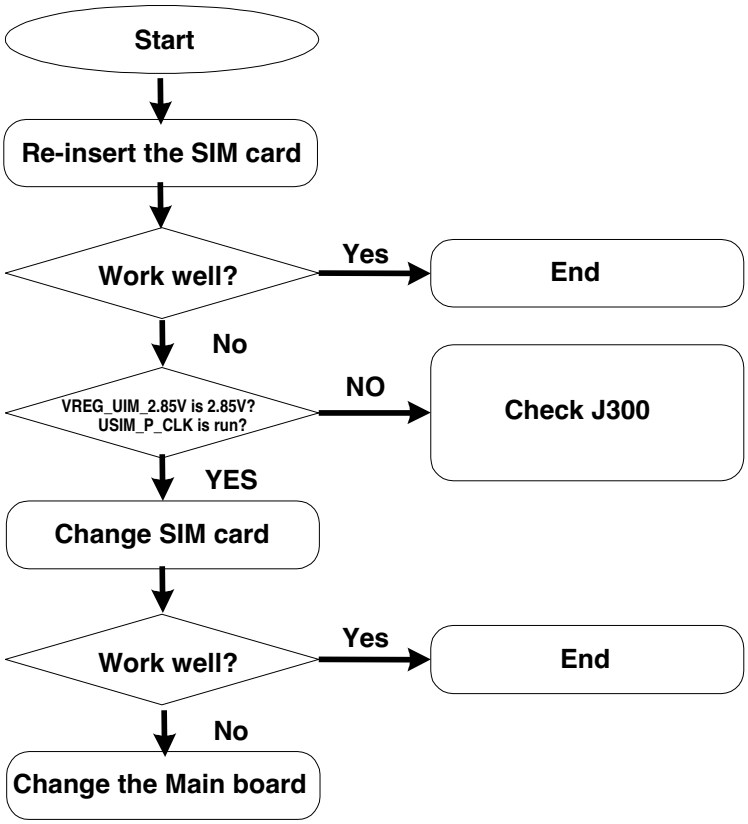
4.11 USB Troubleshooting

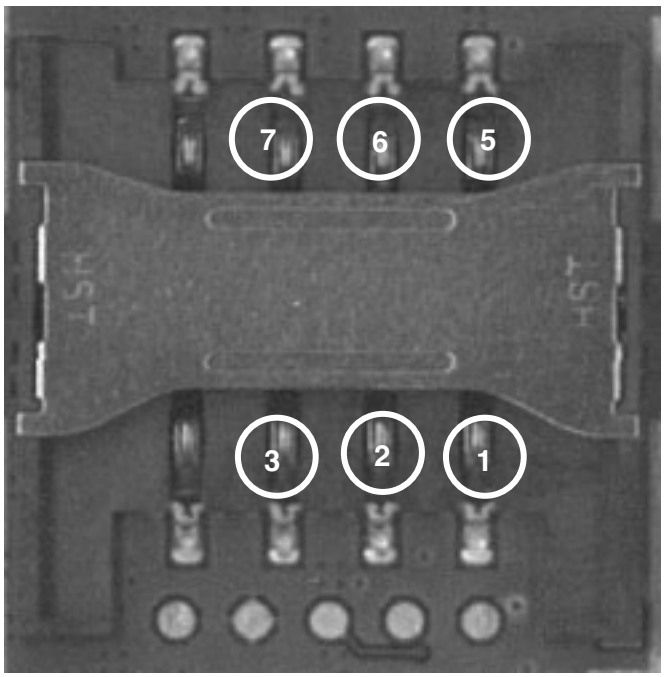
USB Initial sequence of U250/KU250 is :
USB connected to U250/KU250 power on → USB_VBUS(Q300) go to 5V → USB_D+ go to 3.3V → USB_DAT is triggered → USB work.



4.12 SIM Detect Troubleshooting

USIM Initial sequence of U250/KU250 is :
USIM_CLK,USIM_RST,USIM_DATA triggered → VREG_UIM_2.85V go to 2.8V → USIM IF work





1 VREG_USIM_2.85V

2 USIM_P_RST_N

3 USIM_P_CLK

7 USIM_P_DATA

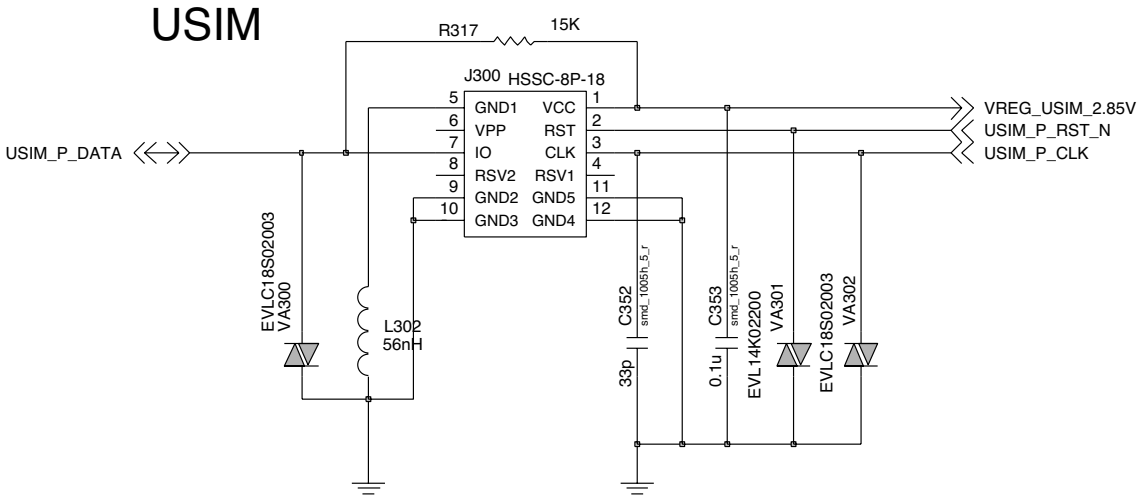
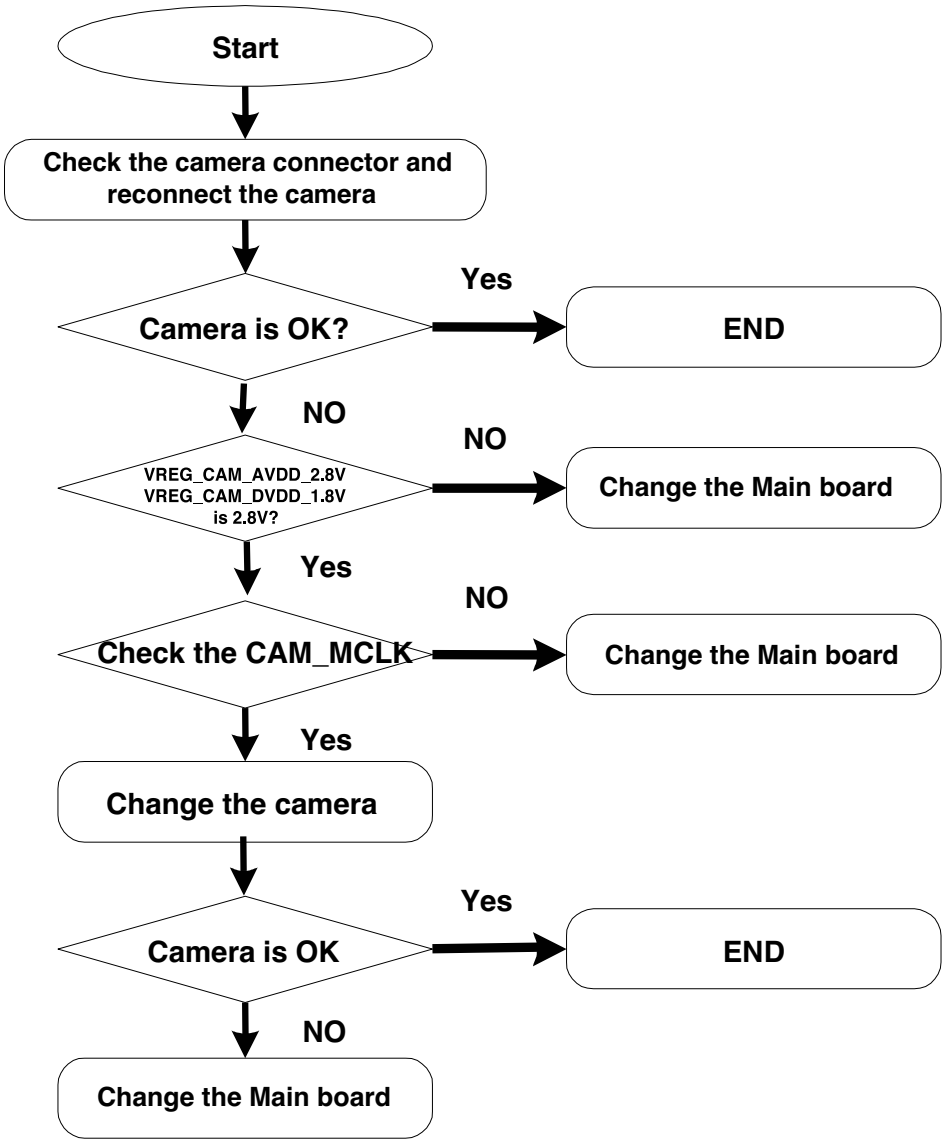


Figure. USIM part schematics

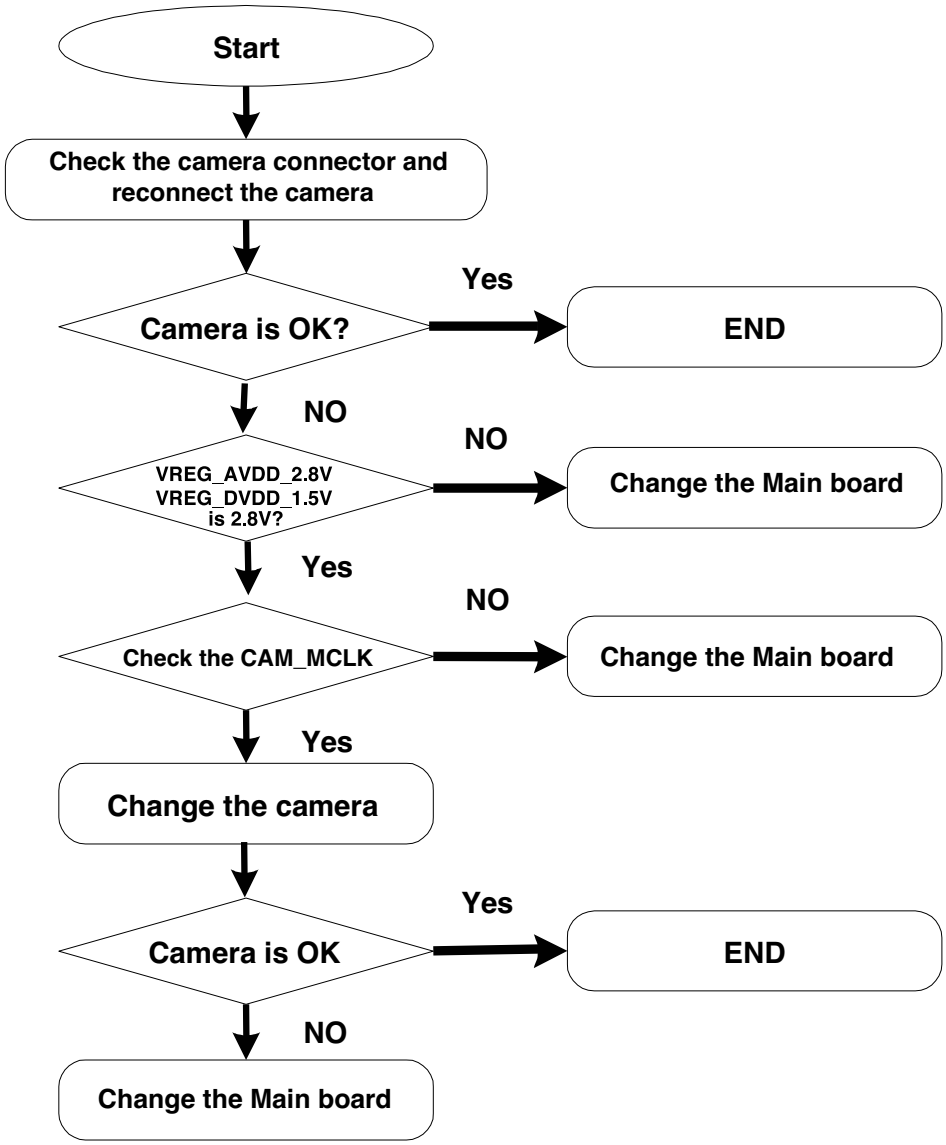
4.13 Camera Troubleshooting

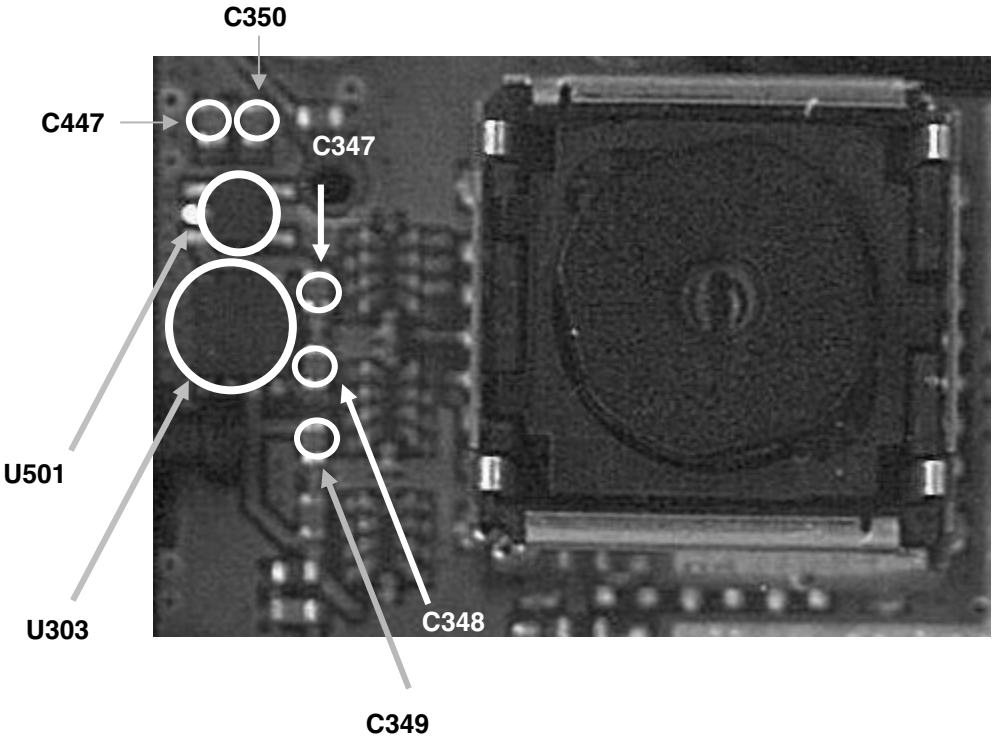
Camera control signals are generated by MSM6245.

4.13.1 MEGA CAMERA

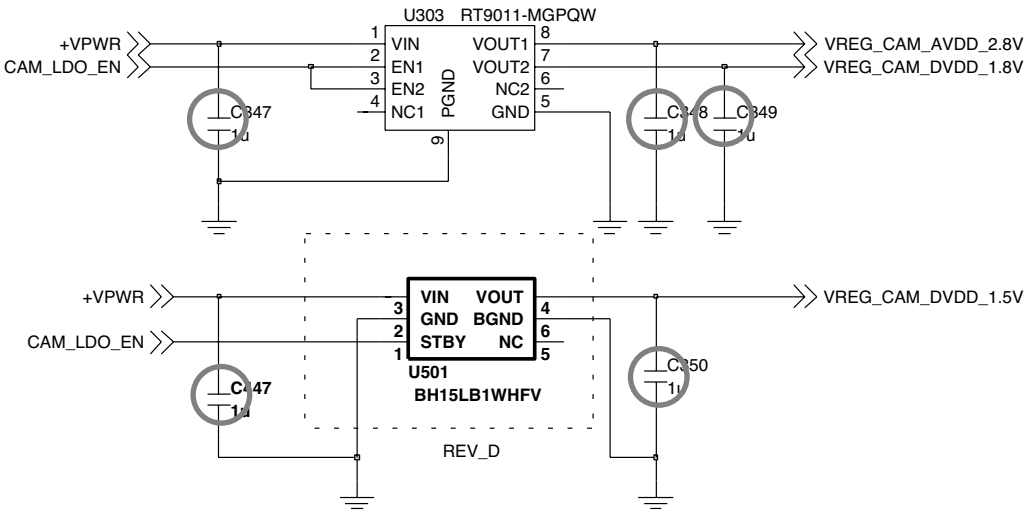


4.13.2 VGA CAMERA



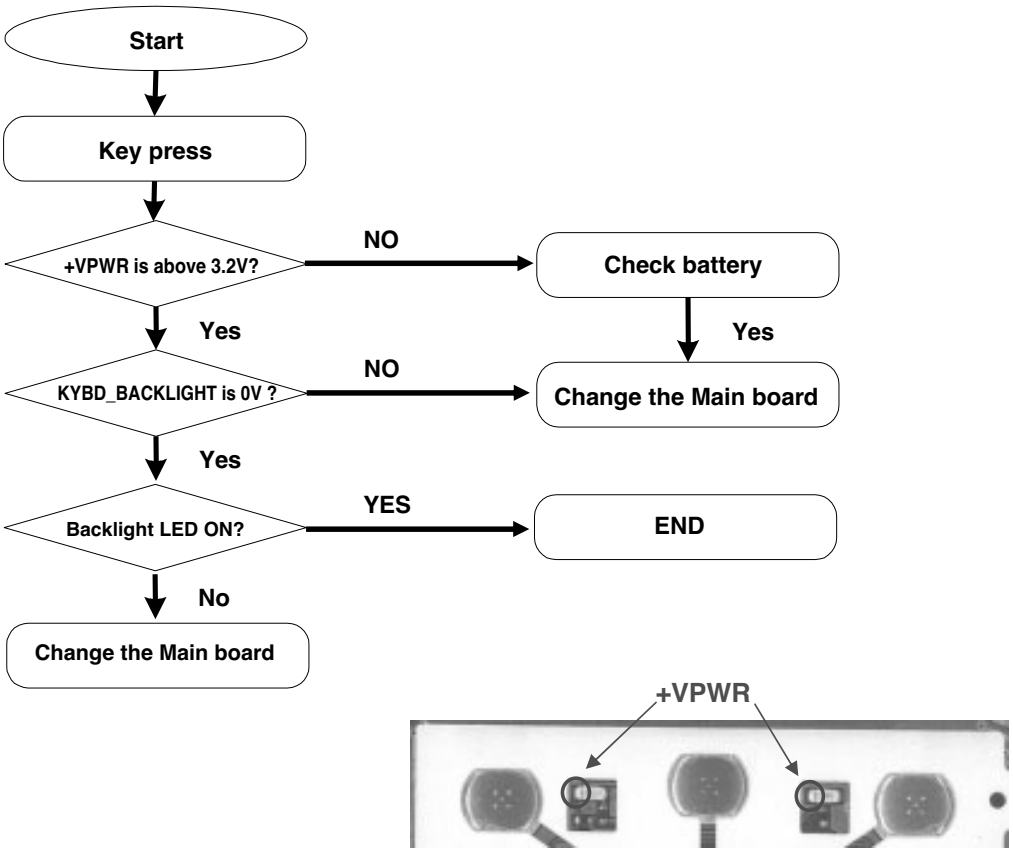

C350
C447
C347
U501
U303
C348
C349

CAMERA LDO


U303 RT9011-MGPQW
+VPWR
CAM_LDO_EN
VIN
EN1
EN2
NC1
PGND
VOUT1
VOUT2
NC2
GND
VREG_CAM_AVDD_2.8V
VREG_CAM_DVDD_1.8V
C347
1u
C348
1u
C349
1u
+VPWR
CAM_LDO_EN
VIN
GND
STBY
VOUT
BGND
NC
U501
BH15LB1WHFV
VREG_CAM_DVDD_1.5V
C447
1u
C350
1u
REV_D

4.14 Keypad Backlight Troubleshooting

Key Pad Back Light is on as below :
Key pressing → KYBD_BACKLIGHT go to 0V → MAIN Key Backlight LED On



KEY_BACK_LIGHT LED(8EA)

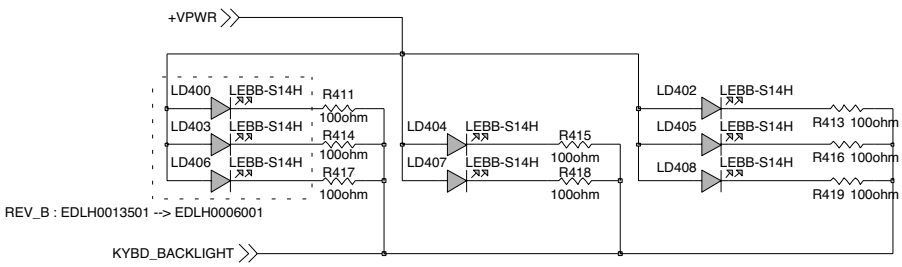
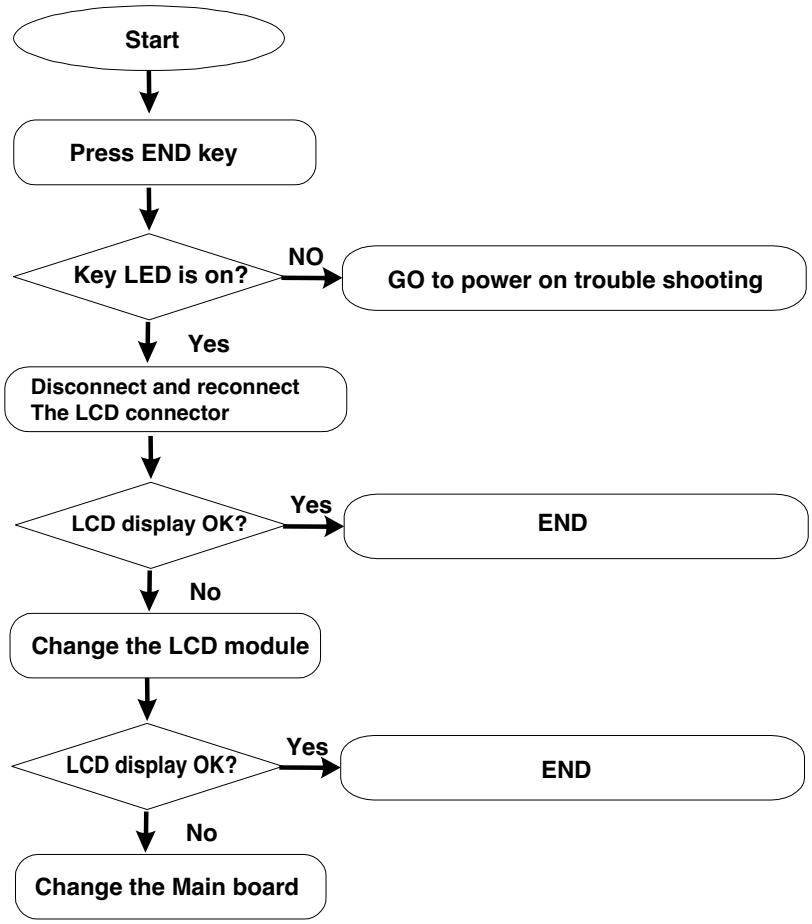


Figure.Keypad backlight LED part

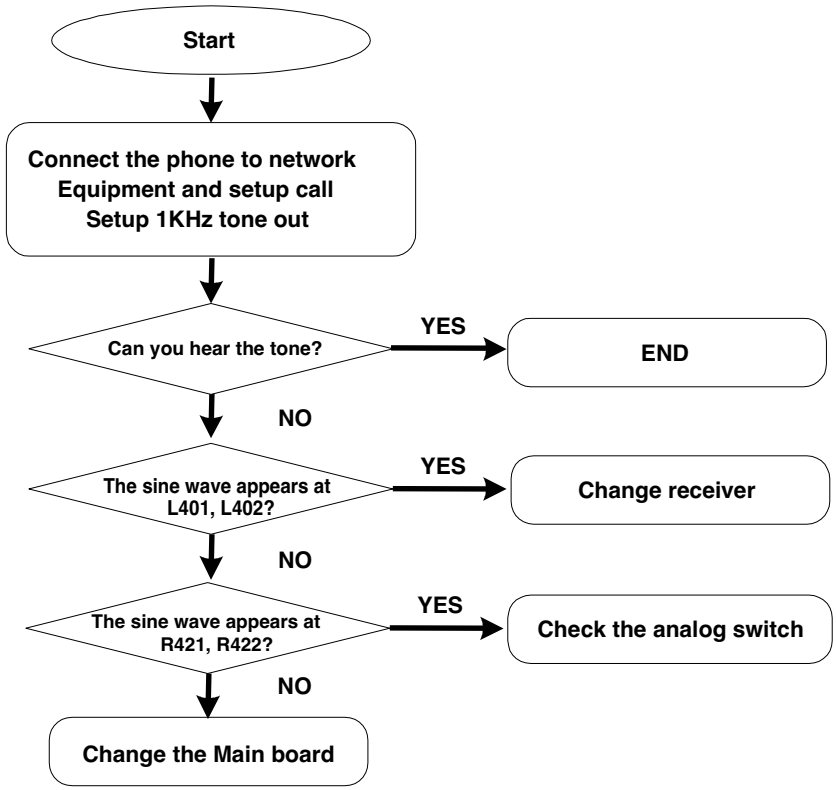
4.15 Main LCD Troubleshooting

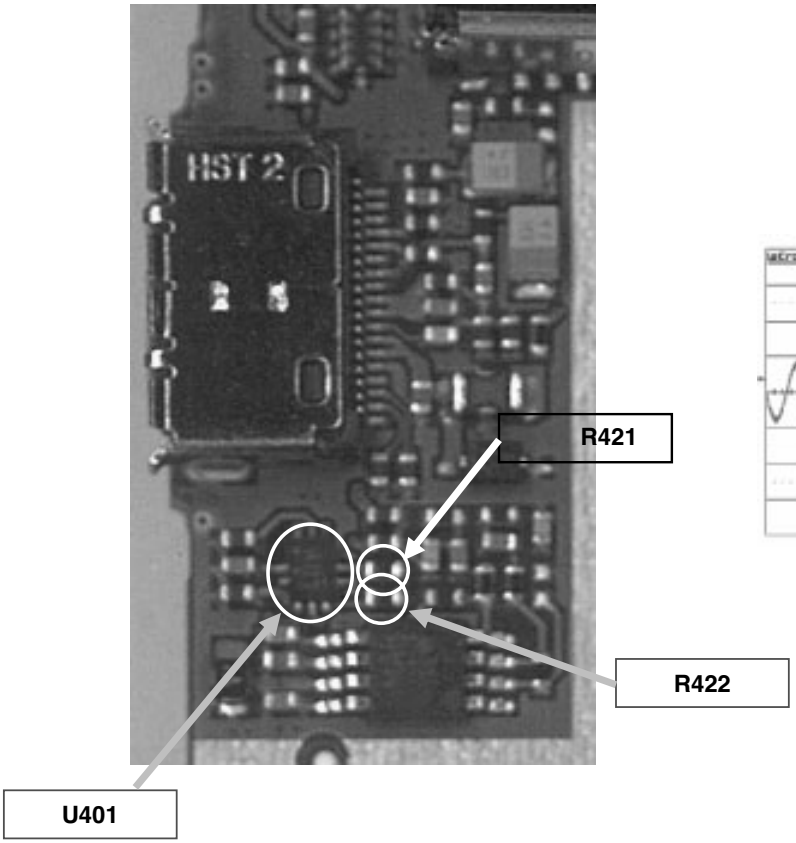
Main LCD control signals are generated by MSM6245. The signal path is :
MSM6245 → CN400 → LCD Module

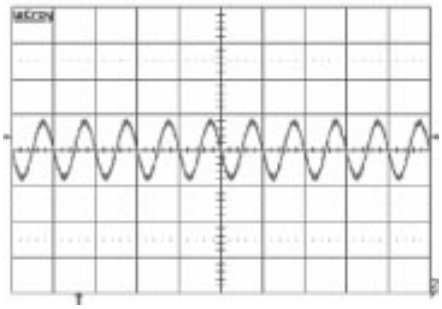


4.16 Receiver Path

MSM6245 EAR1ON/EAR1OP → R421,R422 → Analog Switch(U401) → Receiver

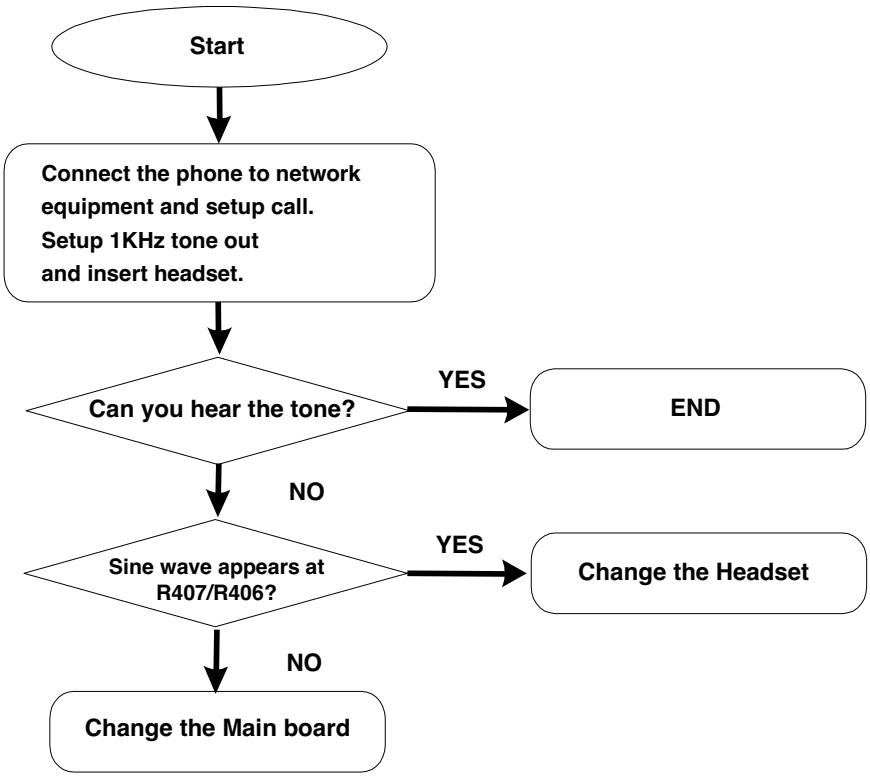


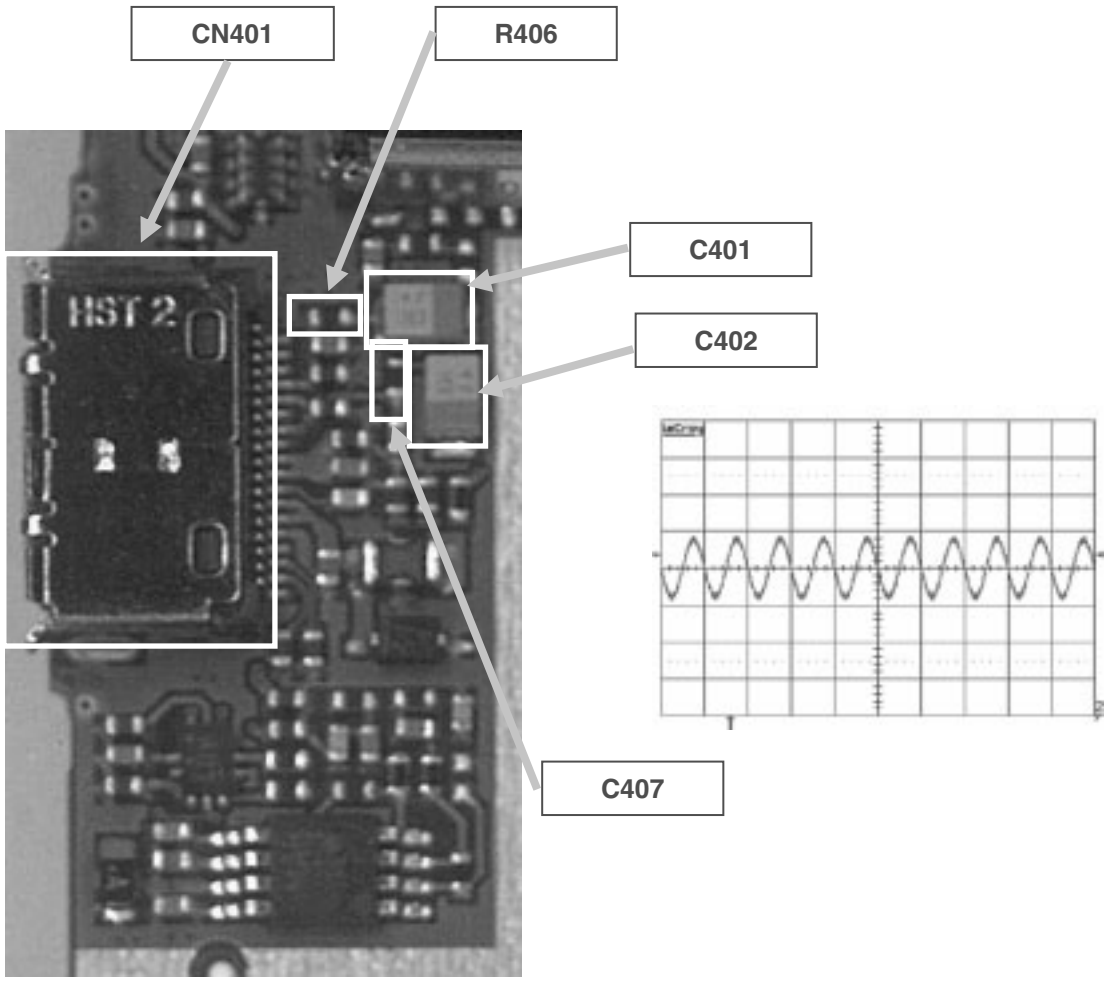

HST 2
R421
R422
U401



4.17 Headset path

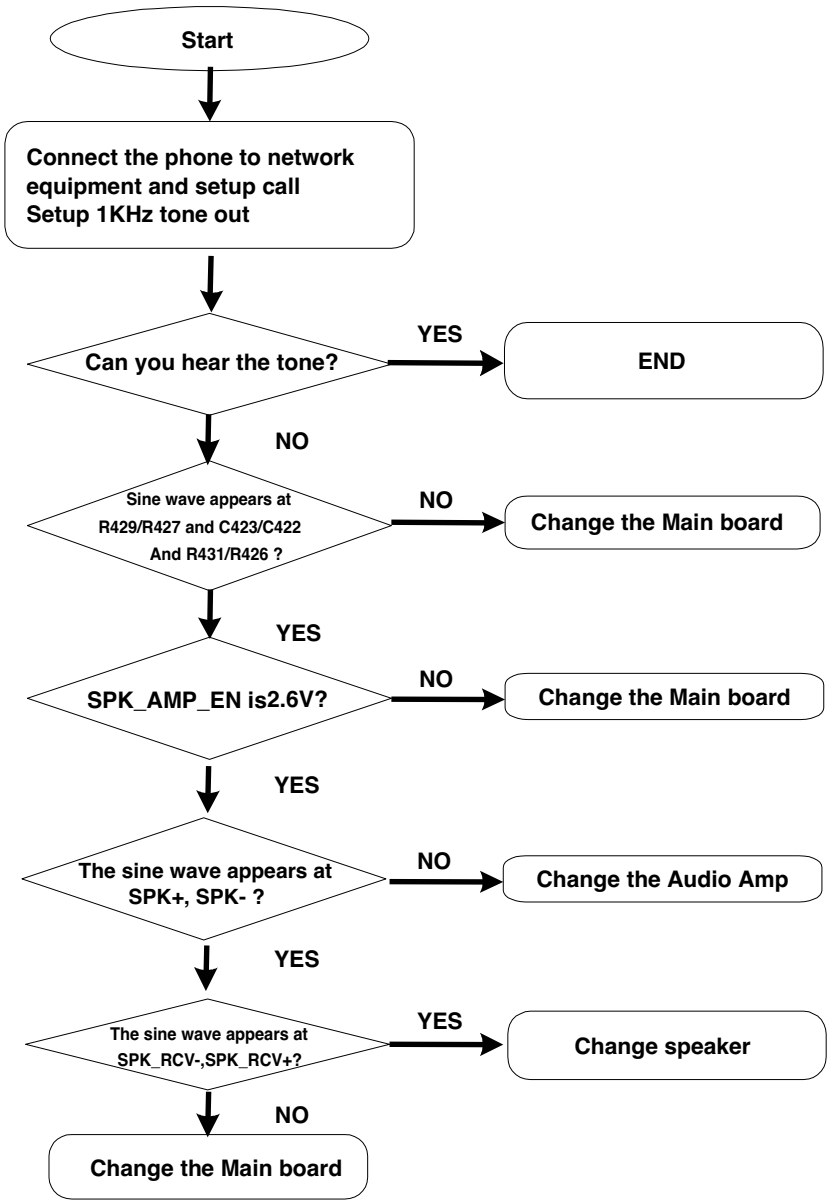
MSM6245 HPH_R, HPH_L → C402/C401 → R407/R406 → CN401 (MMI Connector)

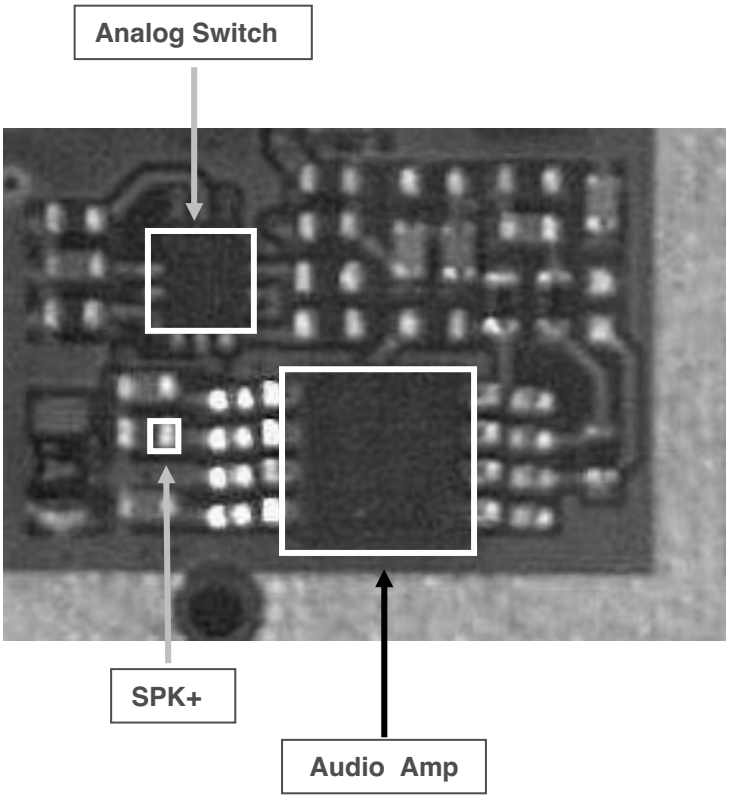


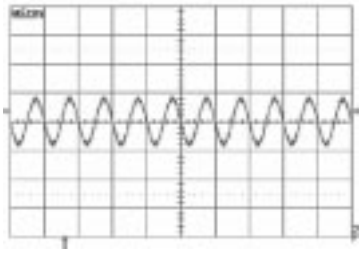

CN401
R406
C401
C402
C407

4.18 Speaker phone path

MSM6245 LINE_P,LINE_N → R429/R427, C423/C422, R431/R426 → Audio AMP(U402) → Analog Switch(U401) → Speaker

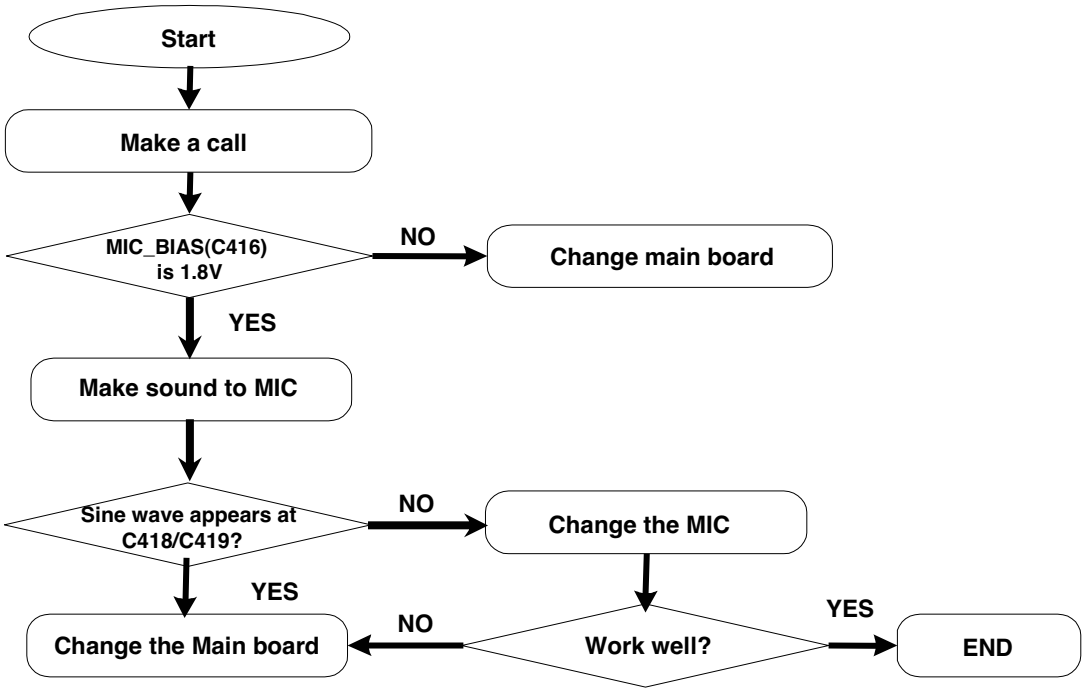


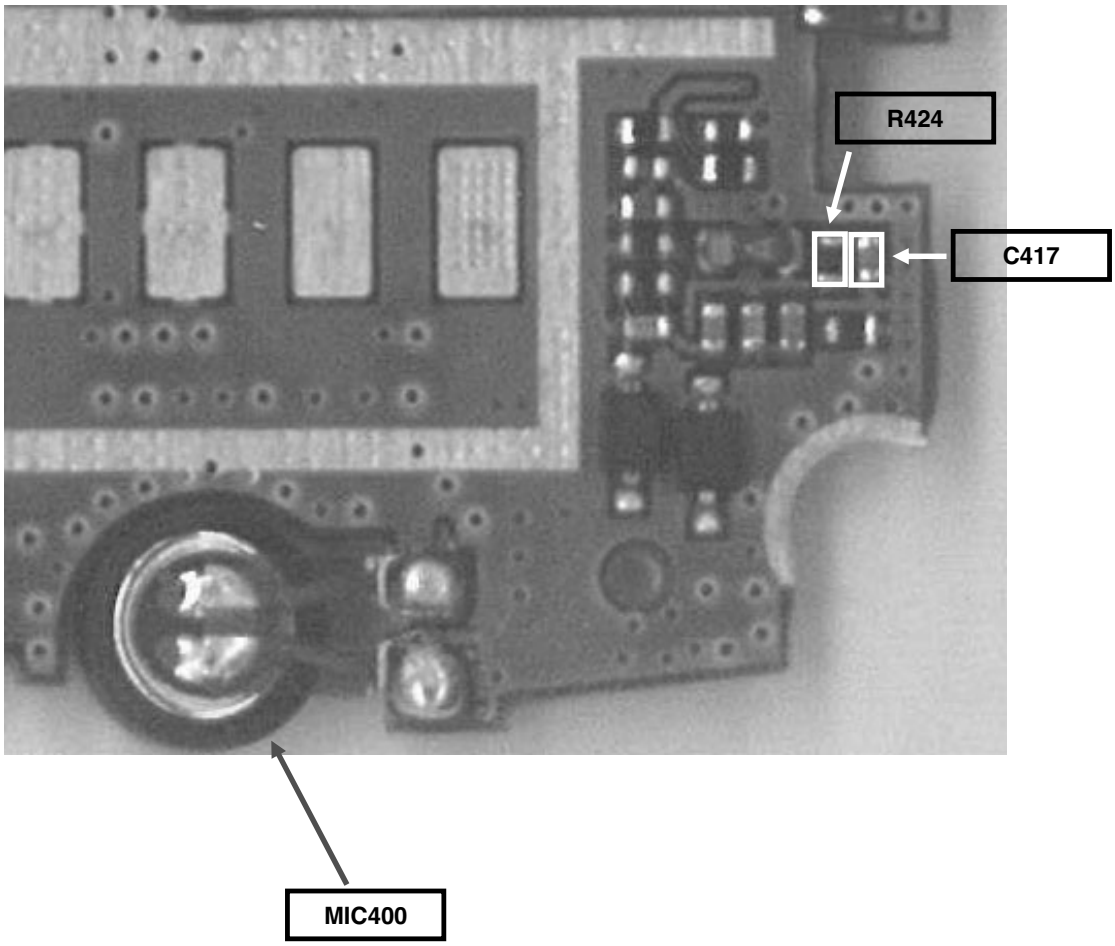

Analog Switch
SPK+
Audio Amp



4.19 Main microphone

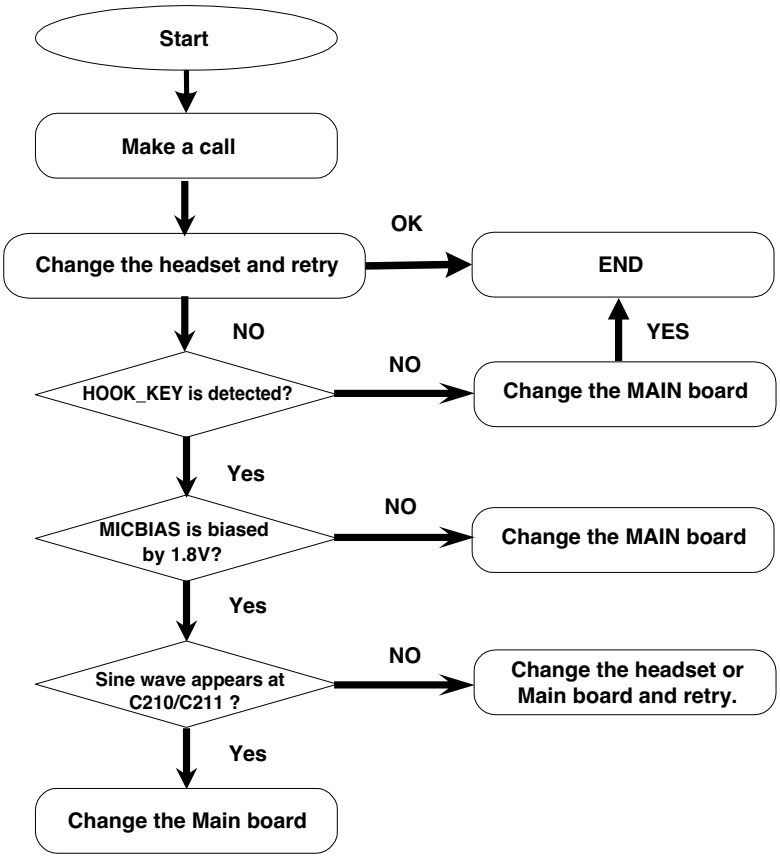
MIC400 → MIC1P, MIC1N (MSM6245)

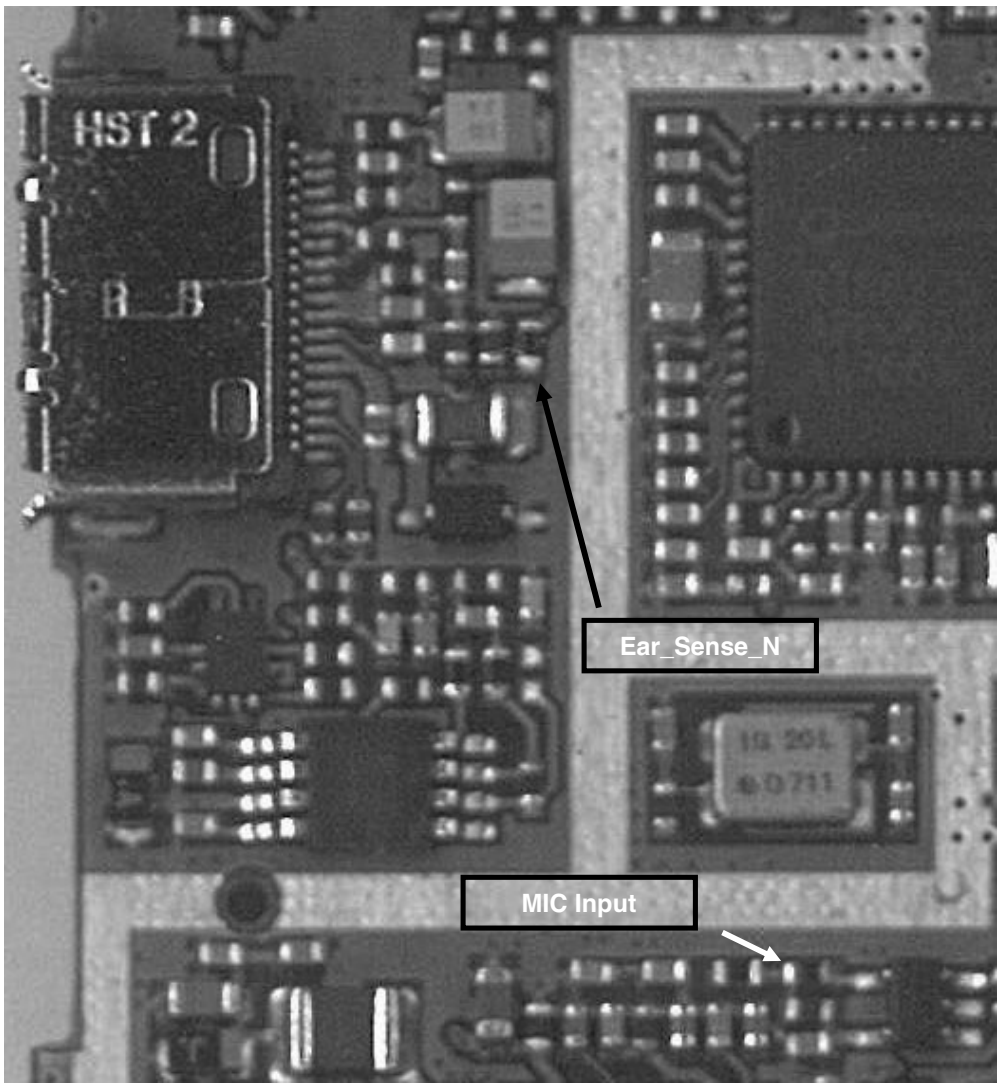



R424
C417
MIC400

4.20 Headset microphone

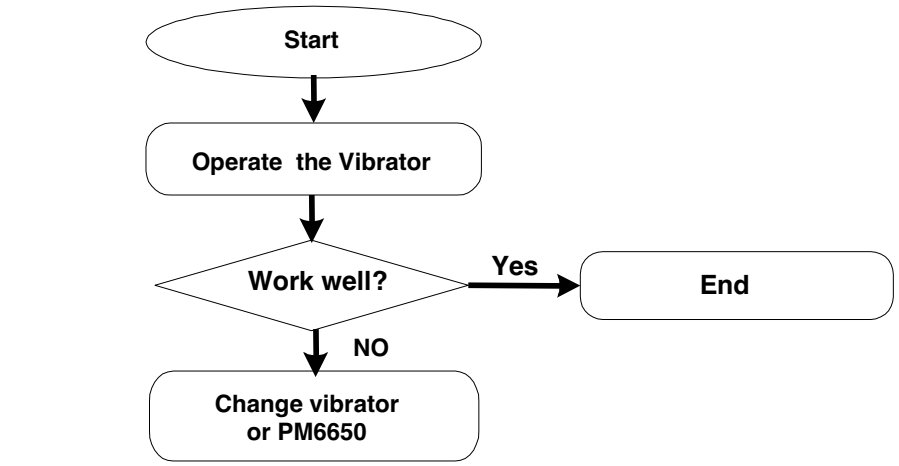
Headset → C210/C211 → MIC2P, MIC2N (MSM6245)

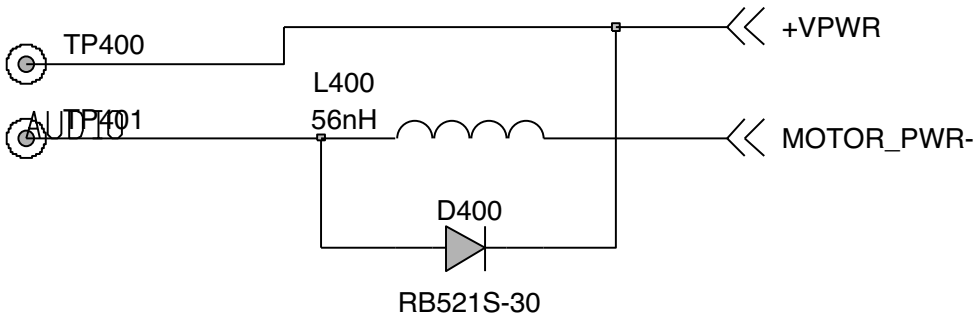


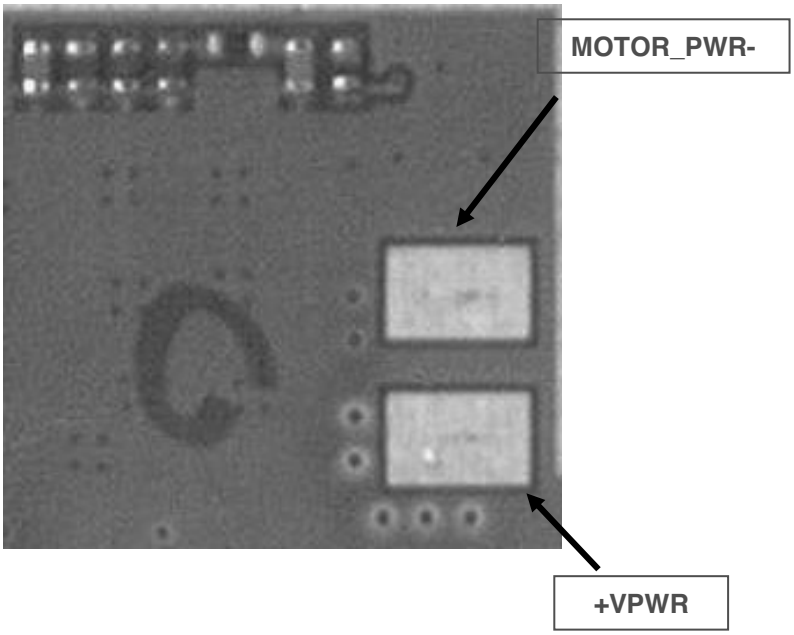

HST 2
Ear_Sense_N
MIC Input

4.21 Vibrator

The Vibrator is connected between +VPWR and VIB_DRV_N (PM6650 25 pin).
The Vibrator motor driver is an SBI-programmable voltage out that is reference to +VPWR.






MOTOR_PWR-
+VPWR

5. DOWNLOAD

5.1 U250/KU250 DOWNLOAD

5.1.1 Introduction

LGMDP is a LGE application that allow users to download images from PC to handset. LGMDP is a download tool with capabilities to upload image files to the handset. LGMDP is designed to be simple to use and easy enough for the beginner to upload executable images to the handset. LGMDP supports Windows 2000/XP where the LG (Ver 4.6 or later) USB modem driver is installed. Additionally, LGMDP allows multi downloading up to 9 handsets at the same time.

5.1.2 Downloading Procedure

• Connect the phone to your desktop PC using the USB cable and run the LGMDP application. Before getting started, set up LGMDP preferences from the Preferences of the file menu the way you want. Click on the File menu and select Preferences.

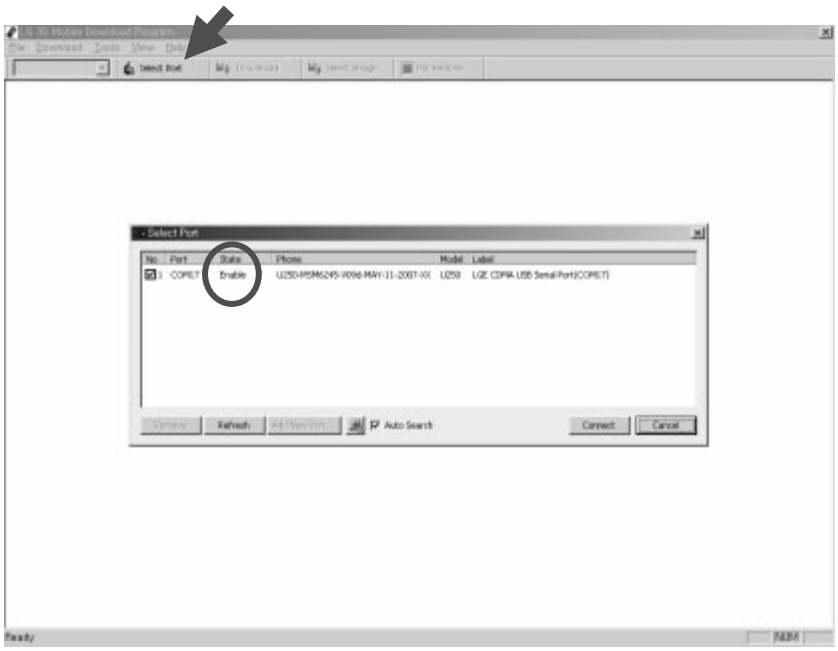
➢ **Play a success sound**
It will be played a .wav file when the download has been completed. To enable this simply check the box.

➢ **Always on Top**
Check if LGMDP always appears at the top of the window so that user can monitor it all the time.

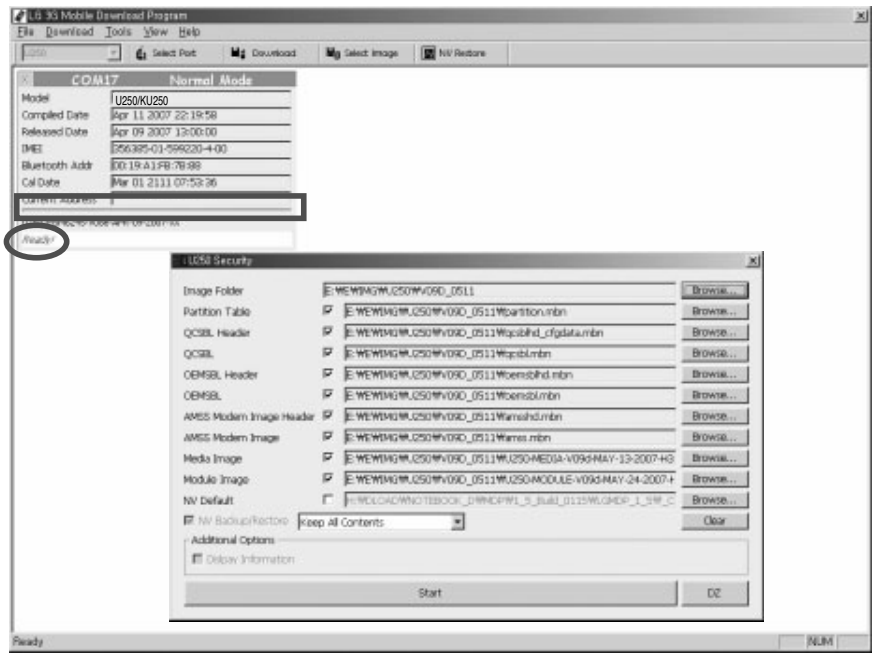
➢ **Automatically run Select Port When LGMDP starts**
When LGMDP starts, it will automatically select Select Port button to download new image file.

5.1.2.1 Connecting to PC

• Click on the Select Port and then Select Port window will be pop up. Check if state shows Enable for the port to be connected for downloading images. Then click on the Connect button. (The port number(COM7) shall be different from that of the port number in the snapshot.)



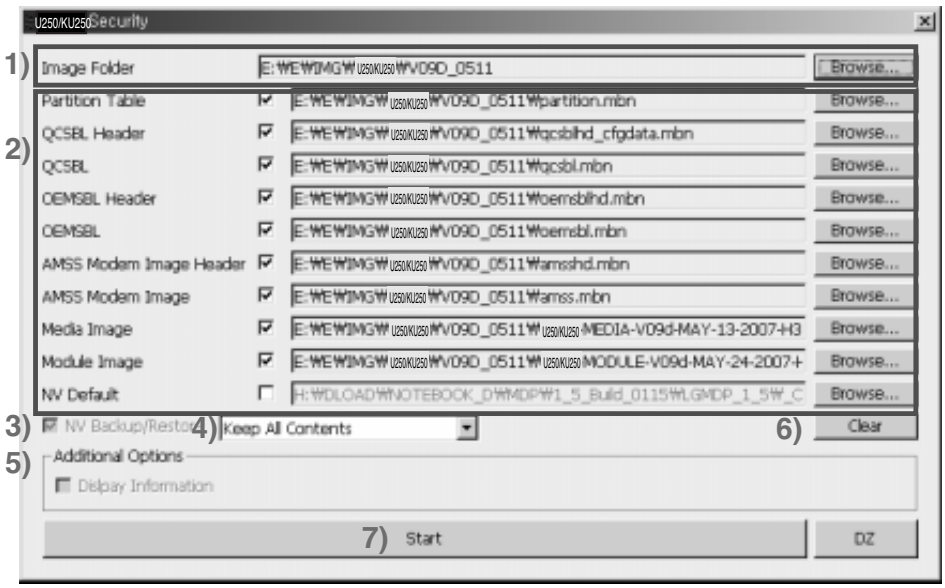
• The status Ready is displayed when the application is ready for downloading. While the images are transmitted from PC to the handset, a progressive bar (Red box) indicating the degree of transmission of data is displayed.



1) Image Folder indicates loot path where all image files are placed. To change location of the default image path, select Browse… button. The edit box shows the file path where images are located. Please note that all images should be located in a selected folder.

2) Click on the Browse… button to select image files to be downloaded on the handset.

3) NV Backup/Restore: NV Backup/Restore always have to be done, and it is default selected option. Backup the NV data and restore the backed up NV data automatically.



4) Reset database & Contents:
User related data including the setting data on the EFS is reset in the handset. The user contents in the handset will be erased. If you want to reset all the user data back to the way they were before you started downloading new images, check the option.
Erase_EFS:
The calibration data, user contents, media, and module are erased. Only calibration data is kept when NV backup/restore is checked. The user contents and file system physically are wiped out.
Keep All Contents
Maintain user data including WAP, AD, DRM, E-mail, Play lists, and images when downloading a new S/W images. User data stated above are maintained if this option is selected.

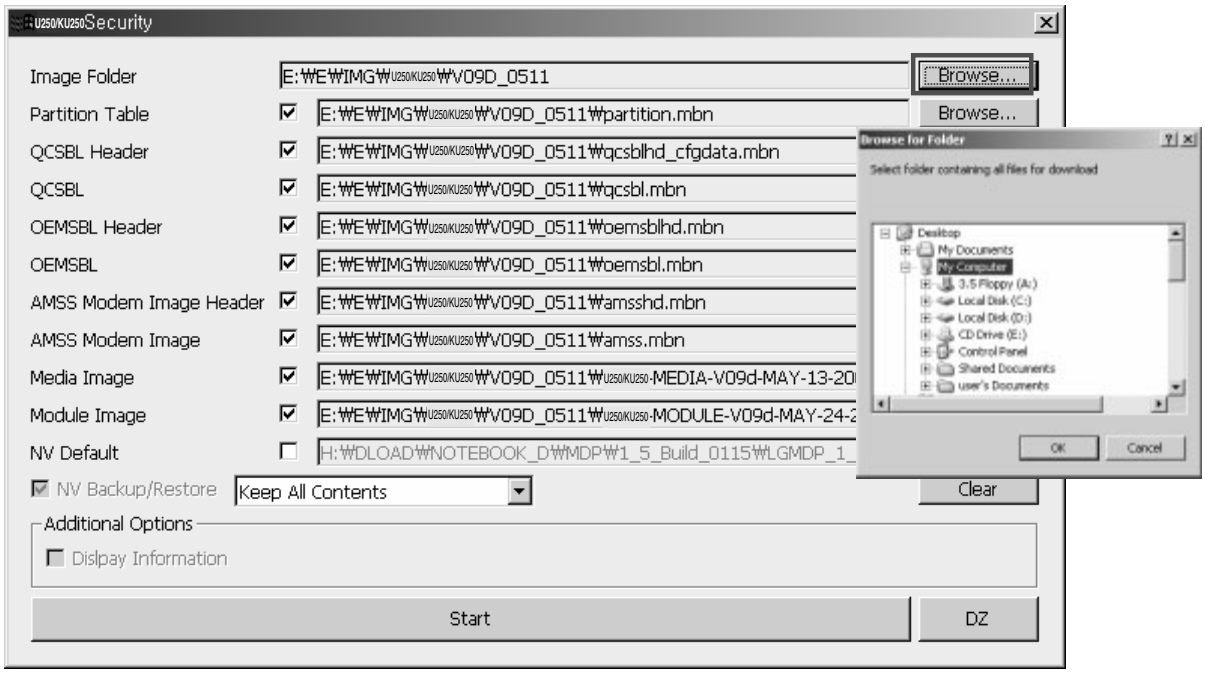
5) Additional Options:
Display Information is defaultly not selected and user cannot choose. Override partition table is also also defaultly not selected and user cannot choose.

6) Clear: Clearing all directory paths of images in the dialog.

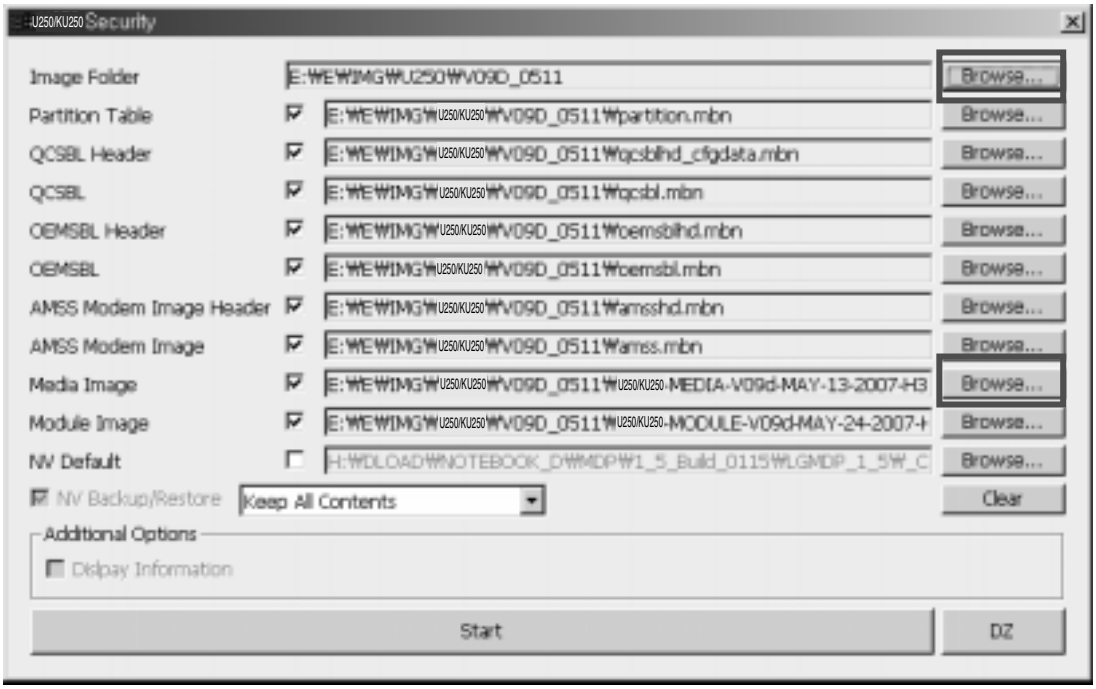
7) Start: Starting downloading the selected individual image.

5.1.2.2 Choosing image files

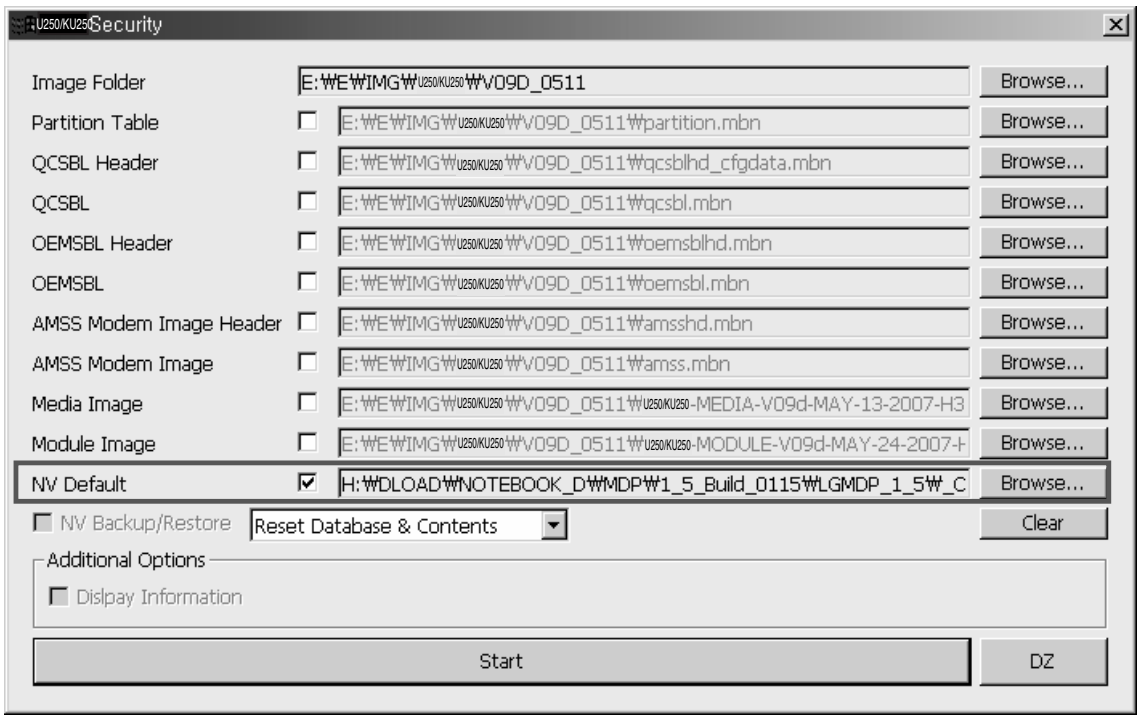
• Select the image folder, where all the image files are located, by clicking on the Browse…. (The folder name shall be different from that of the folder name in the snapshot. The folder name indicates the path where the image files are located.)



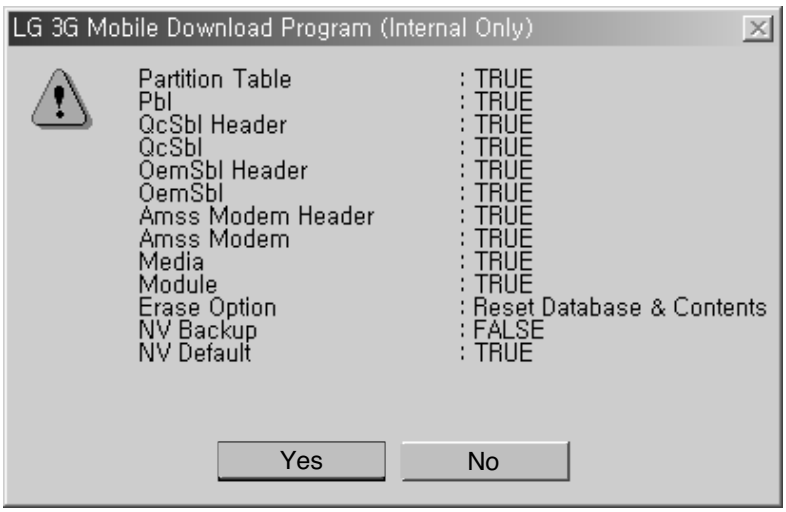
• Select the path on the Image Folder by clicking on the Browse..., then the LGMDP will automatically load images accordingly. Also you can select images by manually. For instance, select the path of AMSS Modem Image file by clicking on the Browse… button. The selected AMSS image will be downloaded to the handset from the path directory in the PC. Make sure that you have chosen correct file. In case of wrong AMSS Modem file is file is selected, the phone may not work.
(The file name shall be different from that of the file name in the snapshot.)



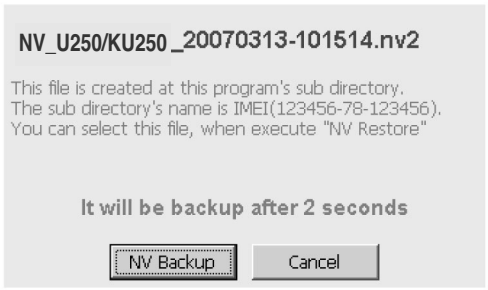
• If NV restore is failed, then the NV Data(*.nv2) is erased permanently. In this case, choose the desired NV file to be downloaded on the handset. To enable this simply check the box or select the NV file from the LGMDP installation directory by clicking on the Browse… button.



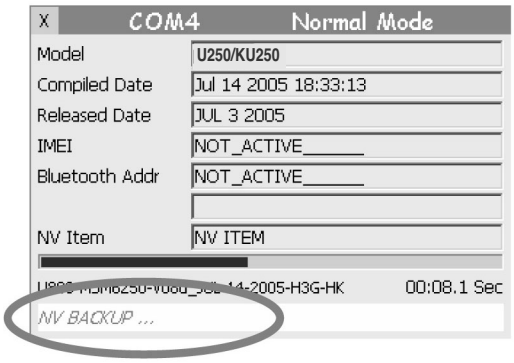
• Click on the START button to start downloading. A summary of the selected images and option information window will be displayed. Click on the No button if this is not the setting you are downloading for. Otherwise click on the Yes button to continue downloading selected image file with options.



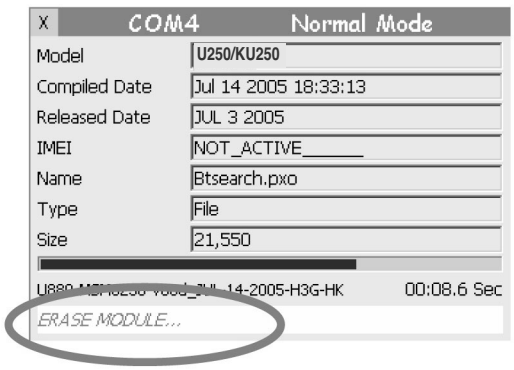
5.1.2.3 Downloading



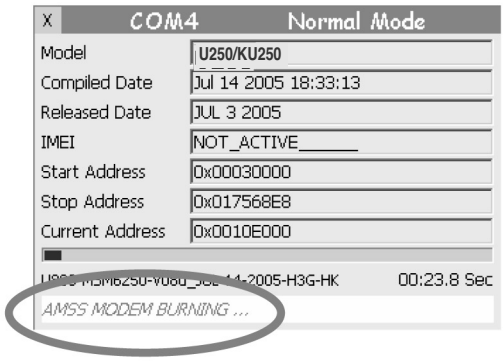
- This message box informs that a new file for NV backup will be created in the displayed file name in the LGMDP installation directory.



- Backing up NV data and backed up NV data will be stored in the LGMDP installation directory.

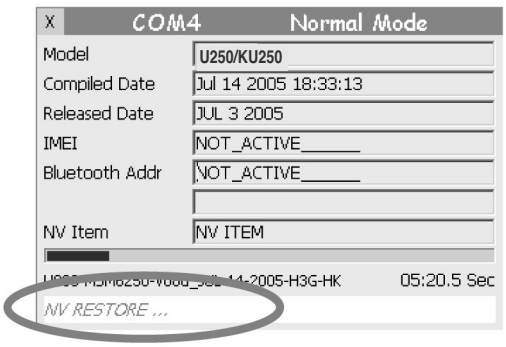


- Erasing the existing directories and files before the Module image is downloaded.

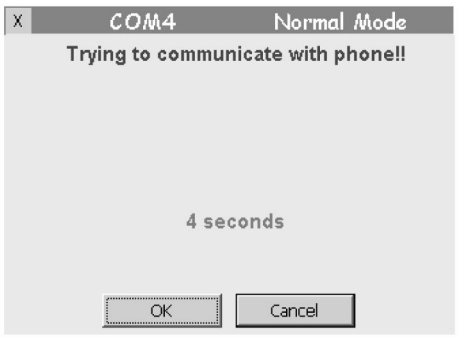


- Downloading the AMSS modem image

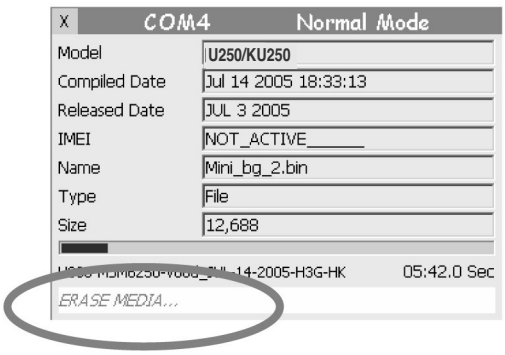
• Rebooting the handset and re-establishing the connection



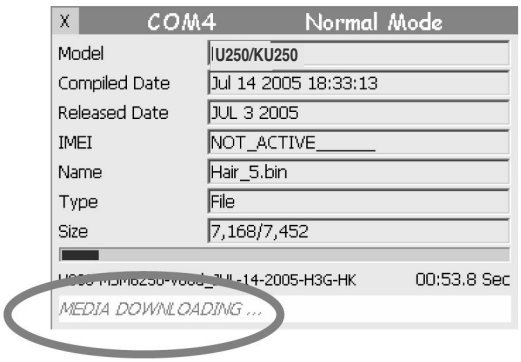
• Restoring NV data which backed up in the Backing up process. User can also restore NV data using NV Default image selection.



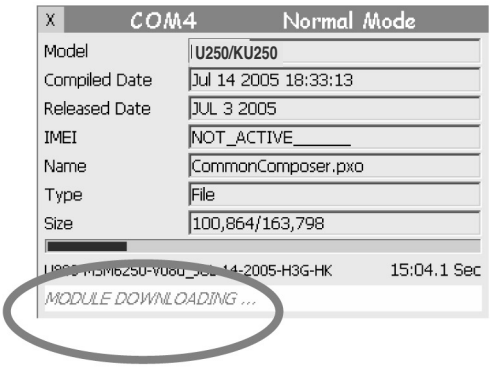
• Rebooting the handset and re-establishing the connection



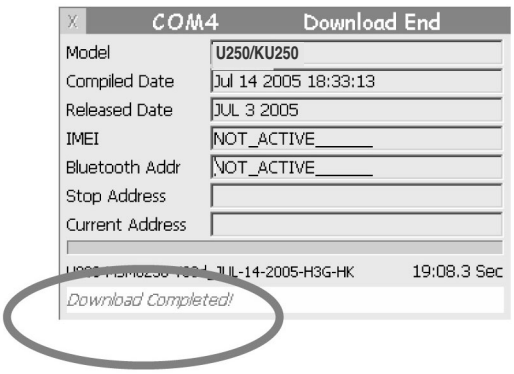
• Erasing the existing directories and files before downloading the selected Media image



• Downloading Media image in progress



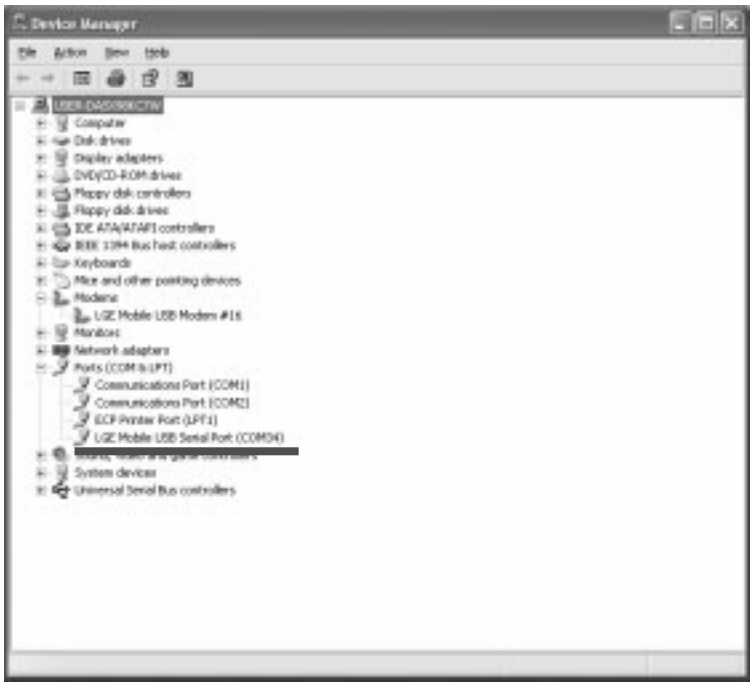
• Downloading Module image in progress



• Downloading process has completed successfully

5.1.2.4 Tools

• Device Manager allows to monitor current hardware that is installed on your PC. Device Manager is designed to monitor USB connectivity and check where the COM has been installed . Select Device Manager from the Tools of the file menu.



5.1.3 Troubleshooting Download Errors

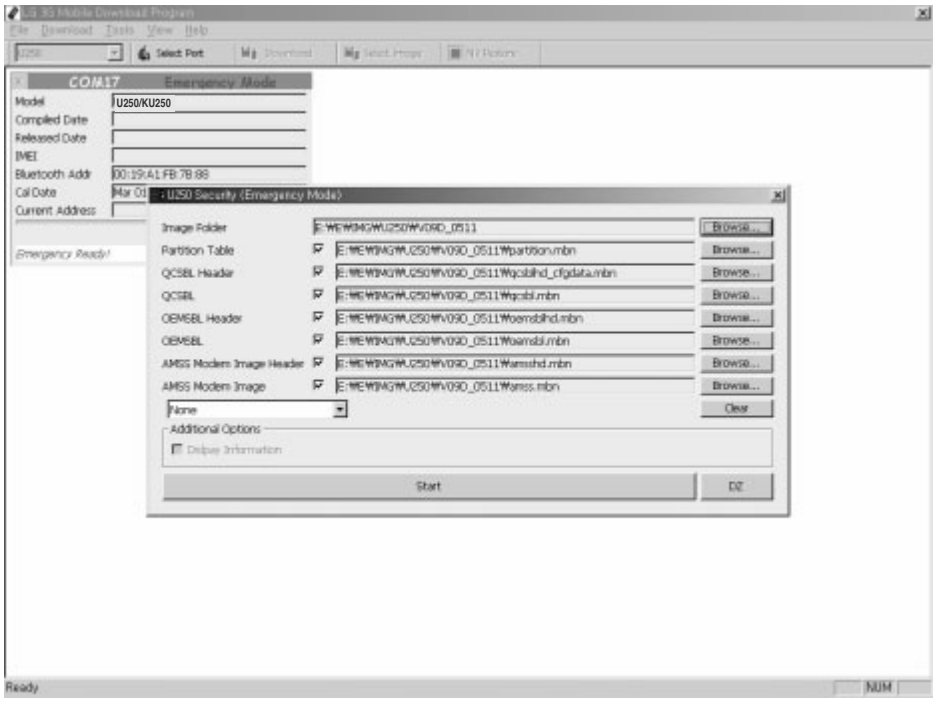
1) When the phone does not work after downloading has been completed.
2) Media Erasing Error
3) NV Restore Error

5.1.3.1 When the phone does not work

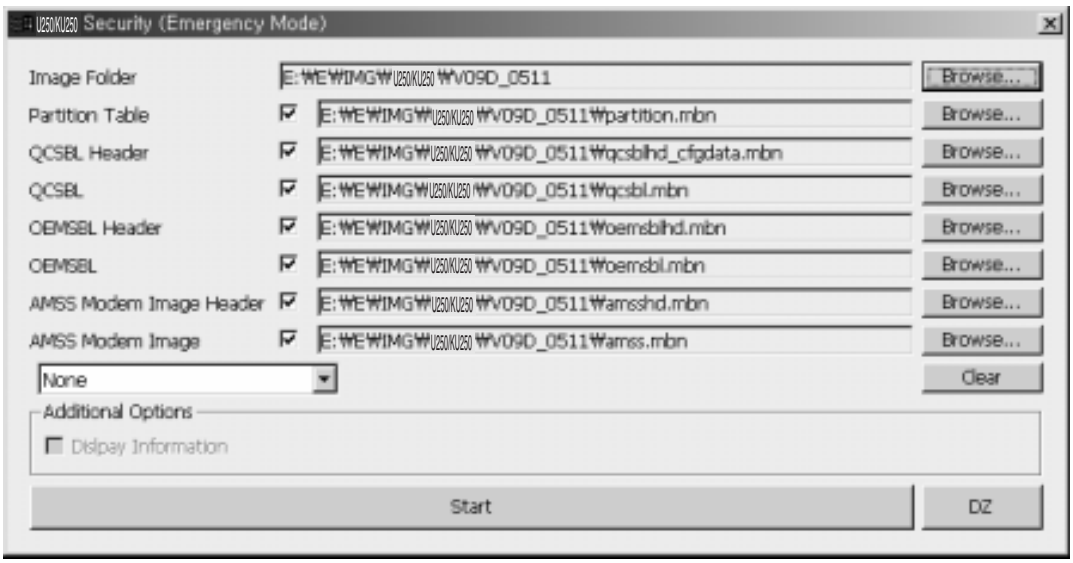
- Reboot the phone in the emergency mode (Simultaneously press 2, 5, and PWR red keys) and then try to download all the images up to AMSS. In the emergency mode, you can not download media or module image.

The phone supports a special mode called emergency mode. In this mode, minimum units for downloading is running so that users can download the images again in case of emergency situation. (AMSS modem, Media, and Module images can not be running in this mode.)

• The below dialog shows parameters of Select Port when phone is booted in Emergency mode. Click on the Connect button to continue.

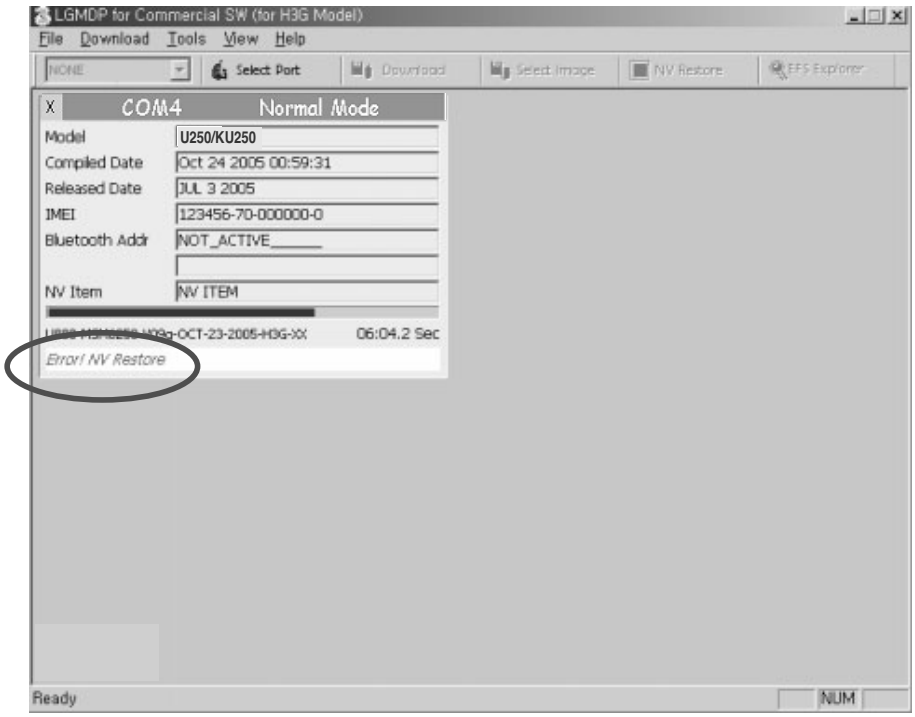


• Choose Image file after clicking on the Browse… button. Make sure that you have chosen the right image file. After choosing valid images, then click on the Start button to start downloading selected images. The selected image will be downloaded to the handset from the path directory in the PC. After downloading images successfully, it will boot to normal mode.

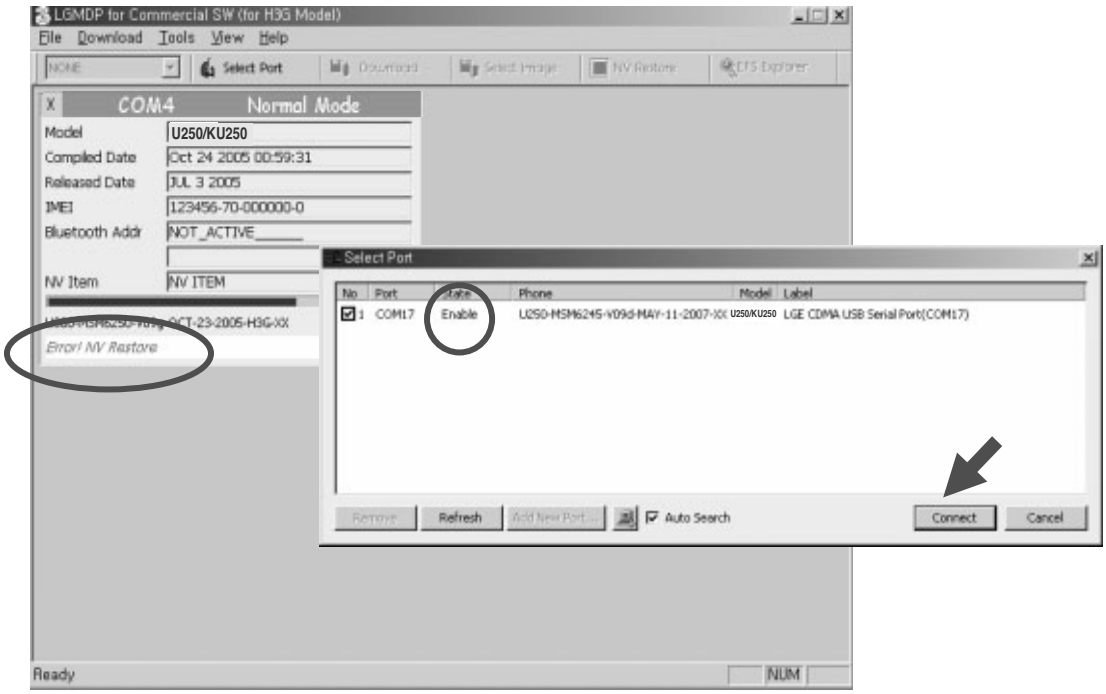


5.1.3.2 NV Restore Error

• Snapshot showing the NV Restore error. Next slide shows the remedial procedure to adopt.

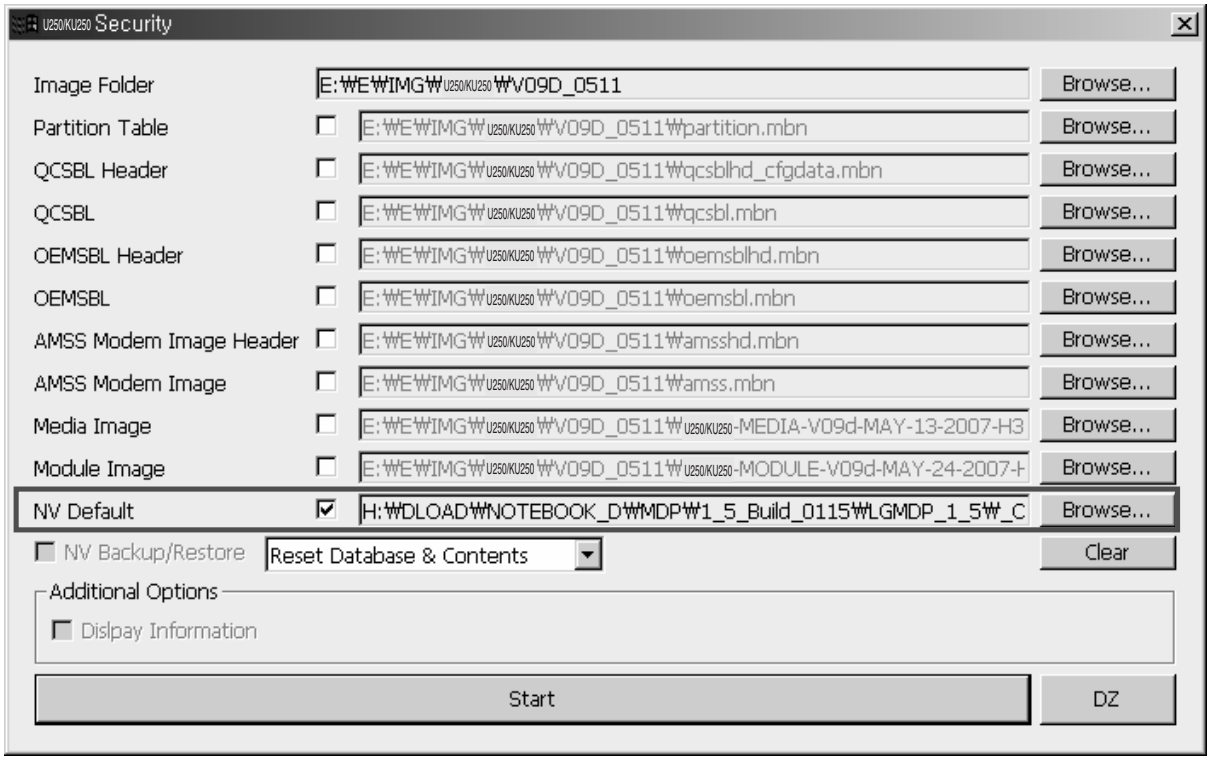


• Connect the handset and Press the Connect button in the Select Port window. (Enable state in the window indicates that the Phone has been detected and is ready to download.)



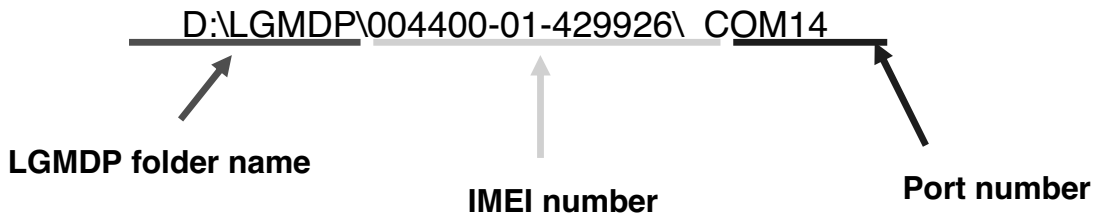
5. DOWNLOAD

• Click on Browse… . Select the LGMDP installation directory and a list of NV Backup files(*.nv2) will be shown. These nv files were saved every time NV Backup option was selected, and the name of the nv file is determined based on the time when NV Backup was done. Choose the desired NV file to be downloaded on the handset, and click on Start.



5.1.4 Caution

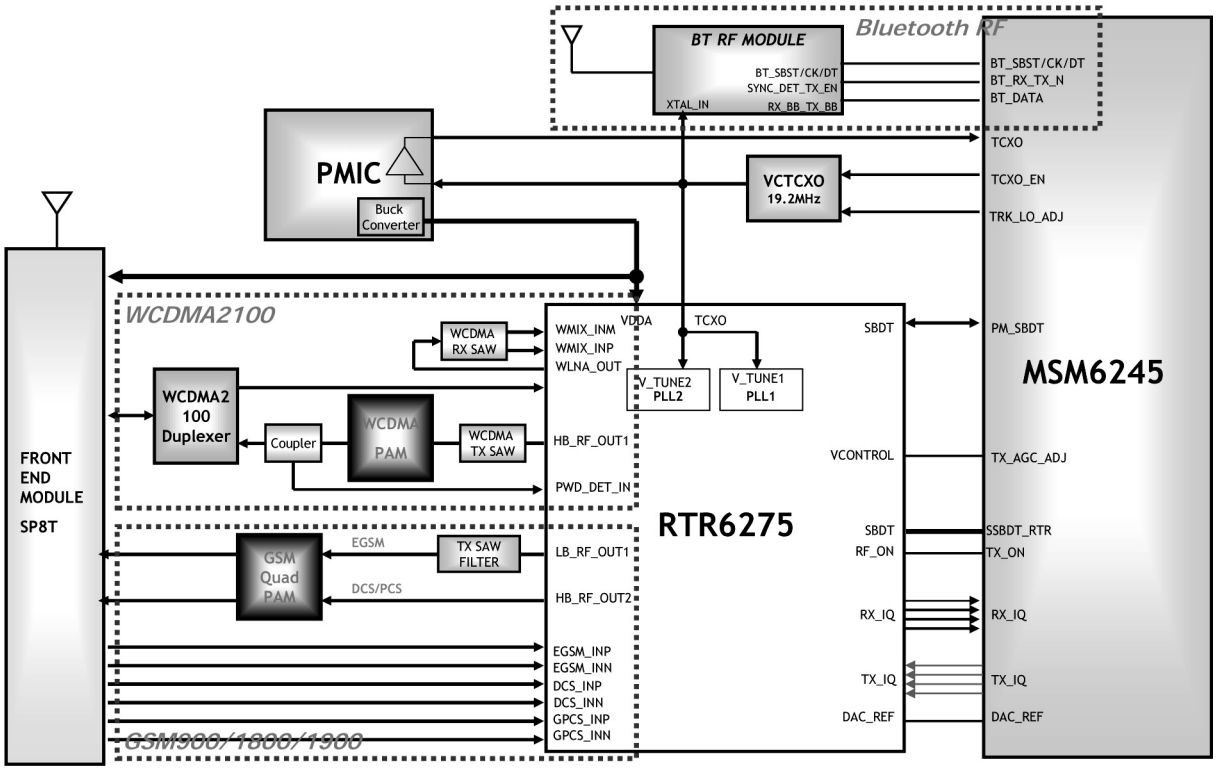
1) Multi-downloading using the USB hub is not recommendable.
2) If you see the message ‘cal mode’ after ‘completing download’, you must do NV restore and image (media and module) download.
3) The NV data saved at LGMDP folder as following format.



4) Recommended that the Module and Media Image have to be downloaded at the same time.
5) Erase EFS option will erase everything (media, module, nv items, and user data) in the EFS area.

6. BLOCK DIAGRAM

6.1 GSM & UMTS RF Block



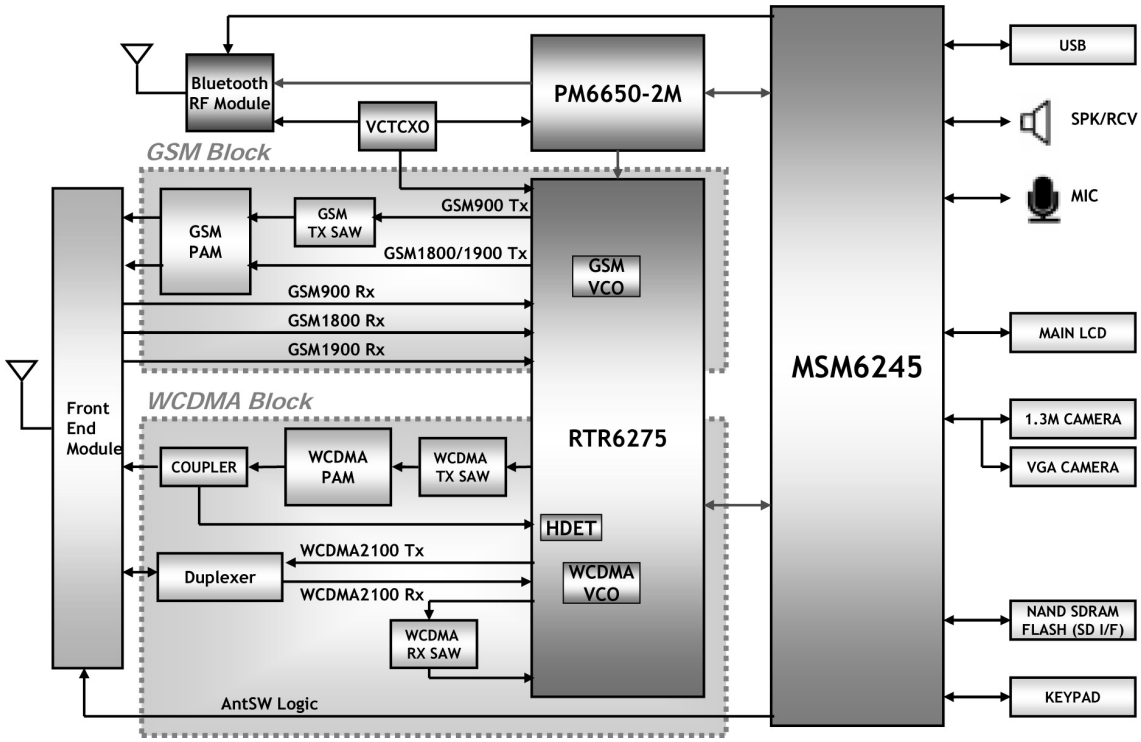
[Fig 2.1] U250/KU250 RF Functional Block Diagram

Ref. Name	Part Name	Function	Comment
U100	RTR6275	UMTS/GSM Transceiver	TRX
U101	SKY77318	GSM TX Dual PAM	TX
U104	TC7SH04FU	Bluetooth buffer	Bluetooth
U102	CP0402A1950DNTR	UMTS2100 coupler	TX
U103	WS2512- TR1G	UMTS2100 PAM	TX
SW100	KMS-507	Test Connector	Calibration, etc
X100	DSA321SCE- 19.2M	VCTCXO	19.2MHz
M100	LBRQ-2B43A	Bluetooth RF Transceiver	Bluetooth TRX
U500	D5011	FEM (Front end Module)	FEM
FL101	EFCH897MTDB1	GSM900 TX SAW Filter	TX
FL102	EFCH1950TDF1	UMTS2100 TX SAW filter	TX
FL103	EFCH2140TDE1	UMTS2100 RX SAW flter	RX
FL104	ACM D-7602	UMTS2100 Duplexer	TRX

[Table 2.1] RF Block Component

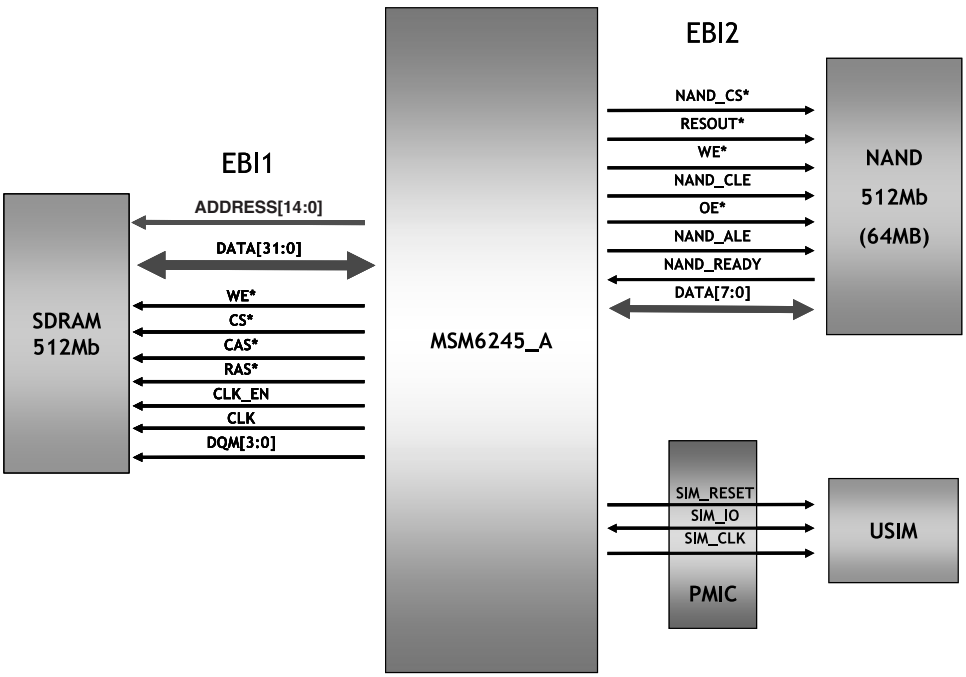
6.2 Interface Diagram

6.2.1 RTR6275 & MSM6245 Interface Diagram



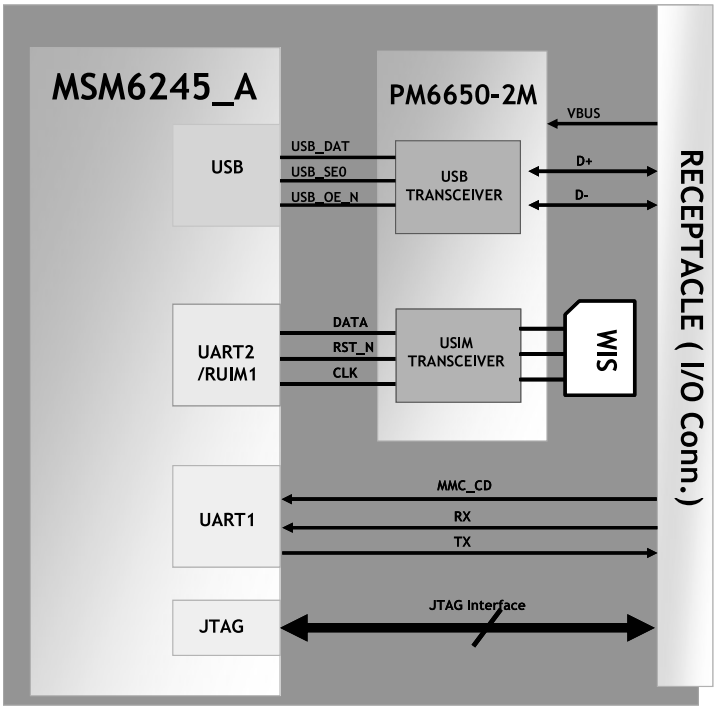
[Fig 2.2] RTR6275 & MSM6245 Interface Diagram

6.2.2 Memory Interface



[Fig 2.3] Memory Interface Diagram

6.2.3 USB,UART,SIM,JTAG Interface



[Fig 2.4] USB, UART, SIM, JTAG Interface

Main RF signal

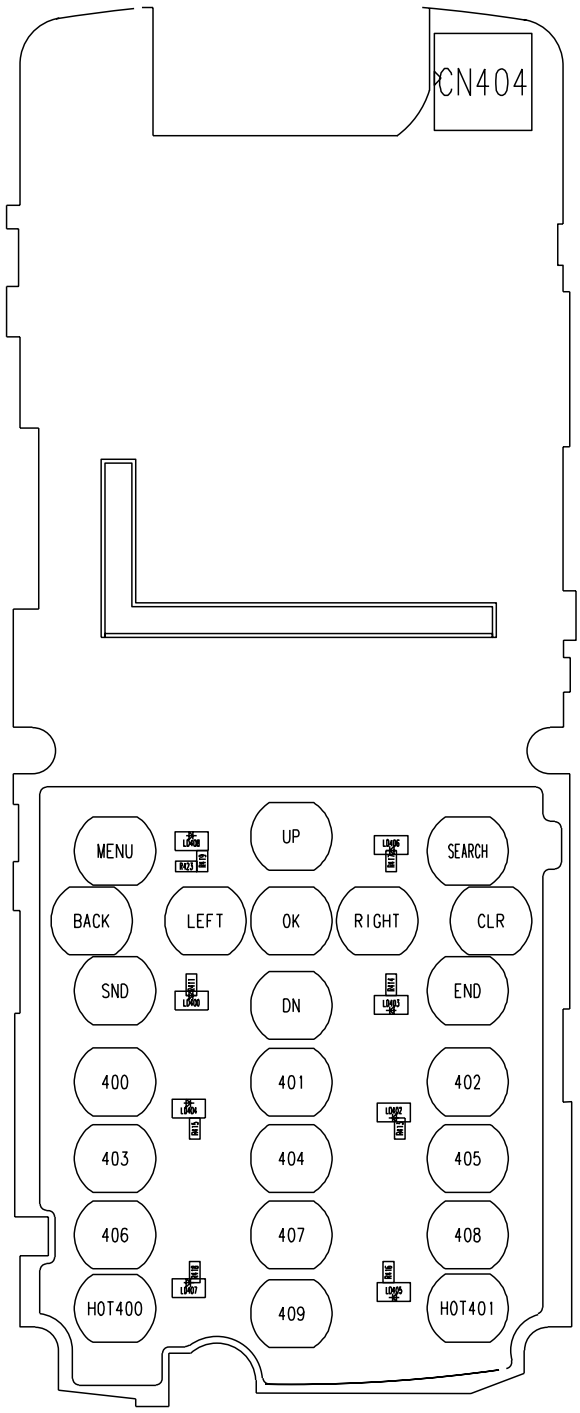
Main RF signal	Description	Comment
GSM 900 TX	GSM 900 TX RF Signal	
DCS TX	DCS TX RF Signal	
PCS TX	PCS TX RF Signal	
UMTS2100 TX	UMTS2100 TX RF Signal	
GSM 900 RX	GSM 900 RX RF Signal	
DCS RX	DCS RX RF Signal	
PCS RX	PCS RX RF Signal	
UMTS2100 RX	UMTS2100 RX RF Signal	
TX_I/Q	I/Q for Tx of RF	
RX_I/Q	I/Q for Rx of RF	

Control signal

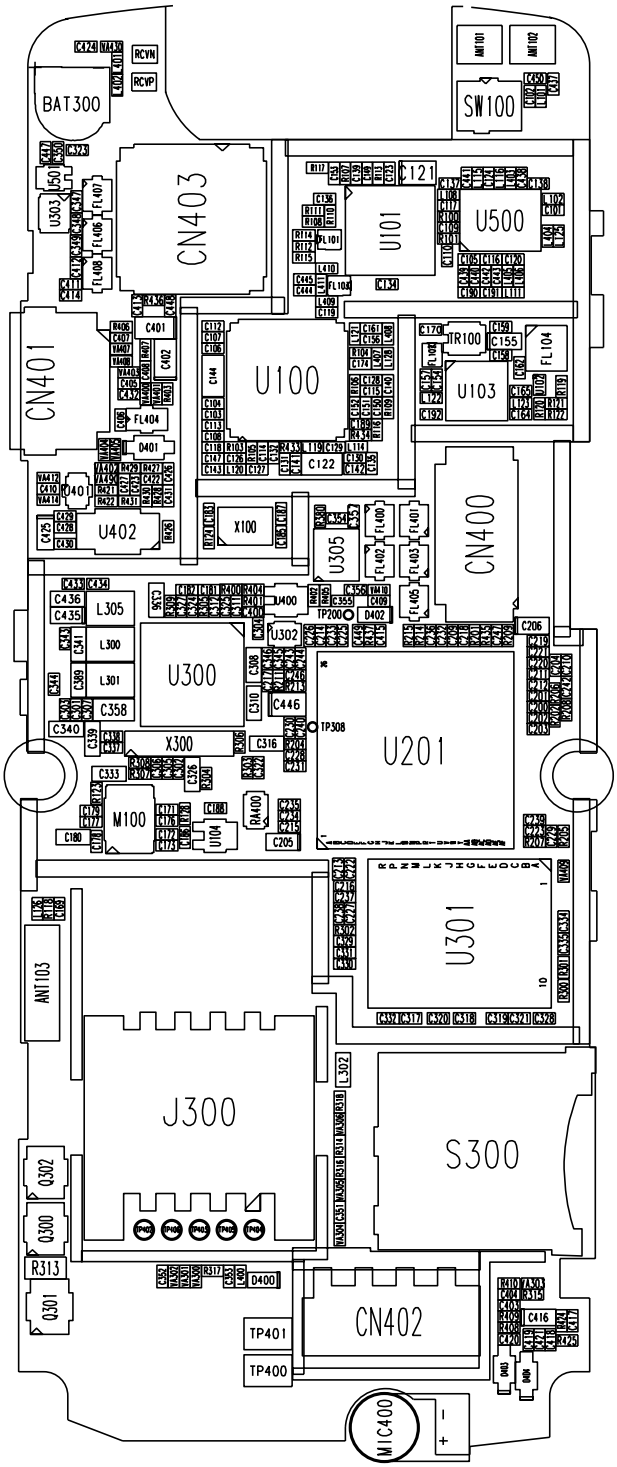
Control signal	Description	Comment
UMTS PA_CTL signal		
PA_R0	UMTS Tx High/Low Power Control	
GSM PA_CTL signal		
GSM_PA_BAND	DCS or PCS /GSM Mode Selection	
GSM_PA_EN	Power Amp Gain Control Enable	
GSM_PA_RAMP	Power Amp Gain Control	
ANT_SEL 0,1	Ant Switch Module Mode Selection	*UMTS, GSM900Tx/Rx, DCS Tx/Rx, PCS Tx/Rx*

6.2.4 Placement

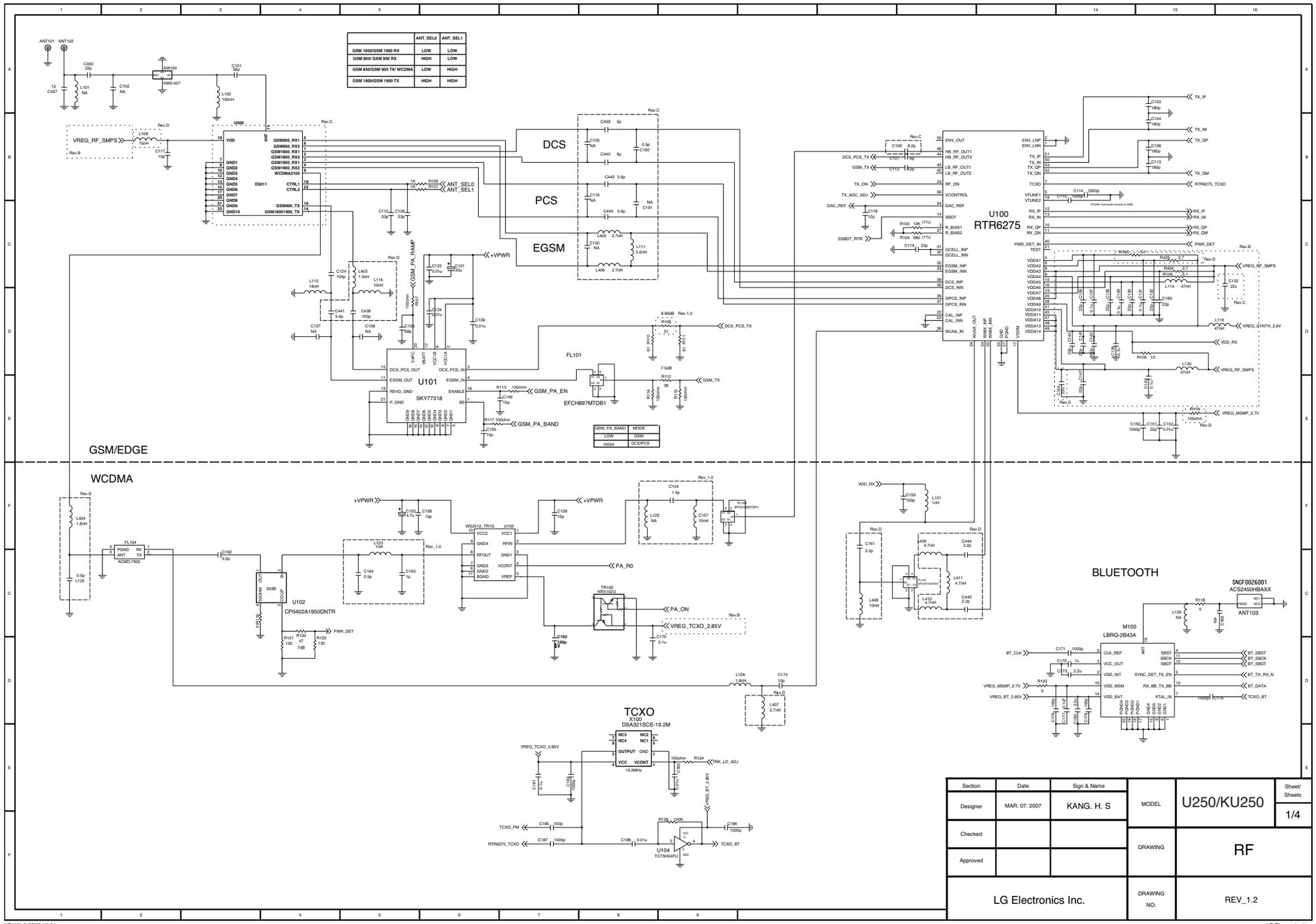
*Top Side



***Bottom Side**


BAT300
SW100
CN403
U101
U500
CN401
U100
U103
CN400
U402
X100
U305
U300
U201
X300
M100
U301
ANT103
J300
S300
Q302
Q300
R313
Q301
CN402
TP401
TP400
MIC400

7. CIRCUIT DIAGRAM



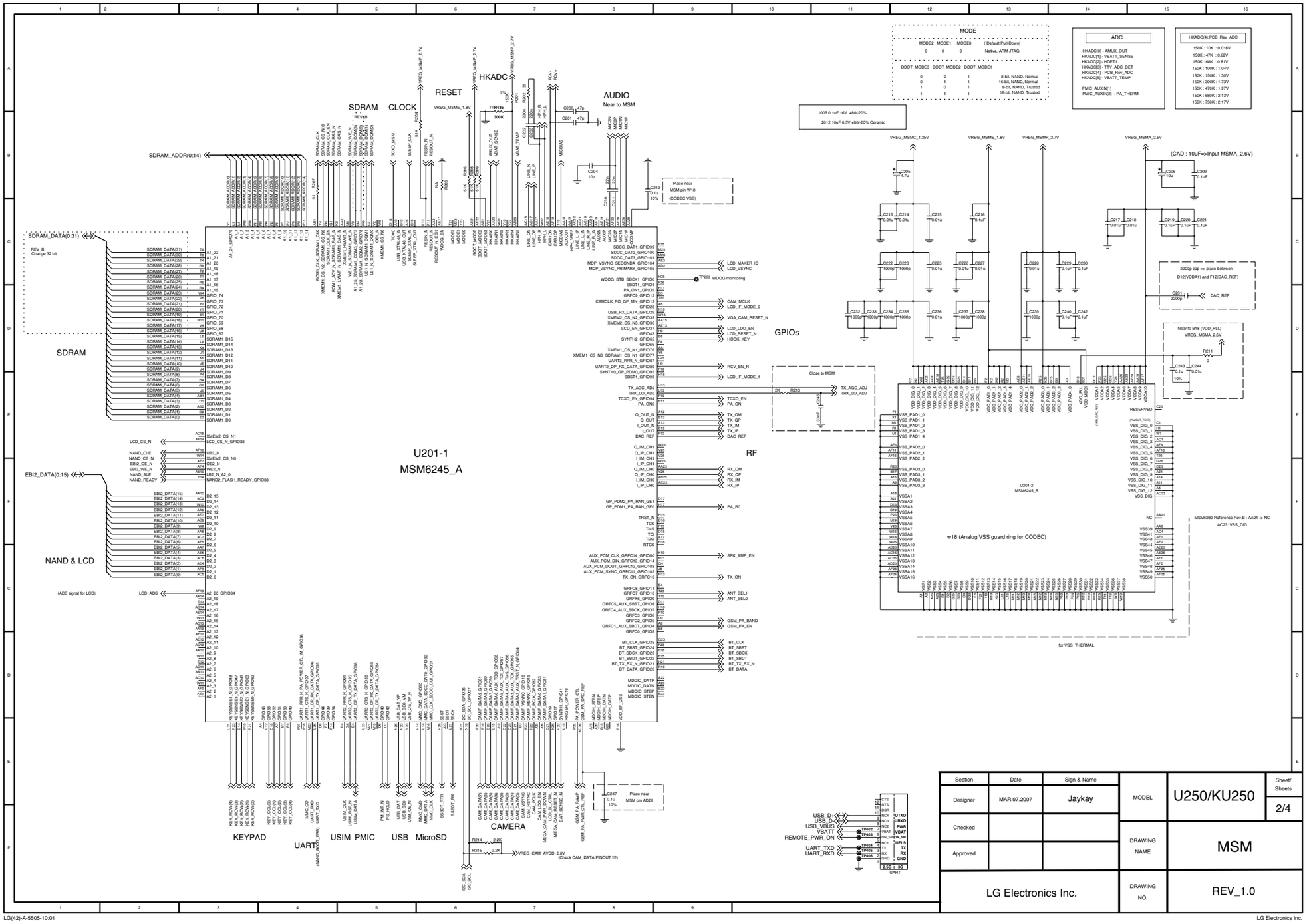
Section	Date	Sign & Name			
Designer	MAR. 07. 2007	KANG. H. S	MODEL	U250/KU250	Sheet/ Sheets 1/4
Checked			DRAWING	RF	
Approved					
LG Electronics Inc.			DRAWING NO.	REV_1.2	

LG(42)-A-5505-10:01

LG Electronics Inc.

LGMC

7. CIRCUIT DIAGRAM



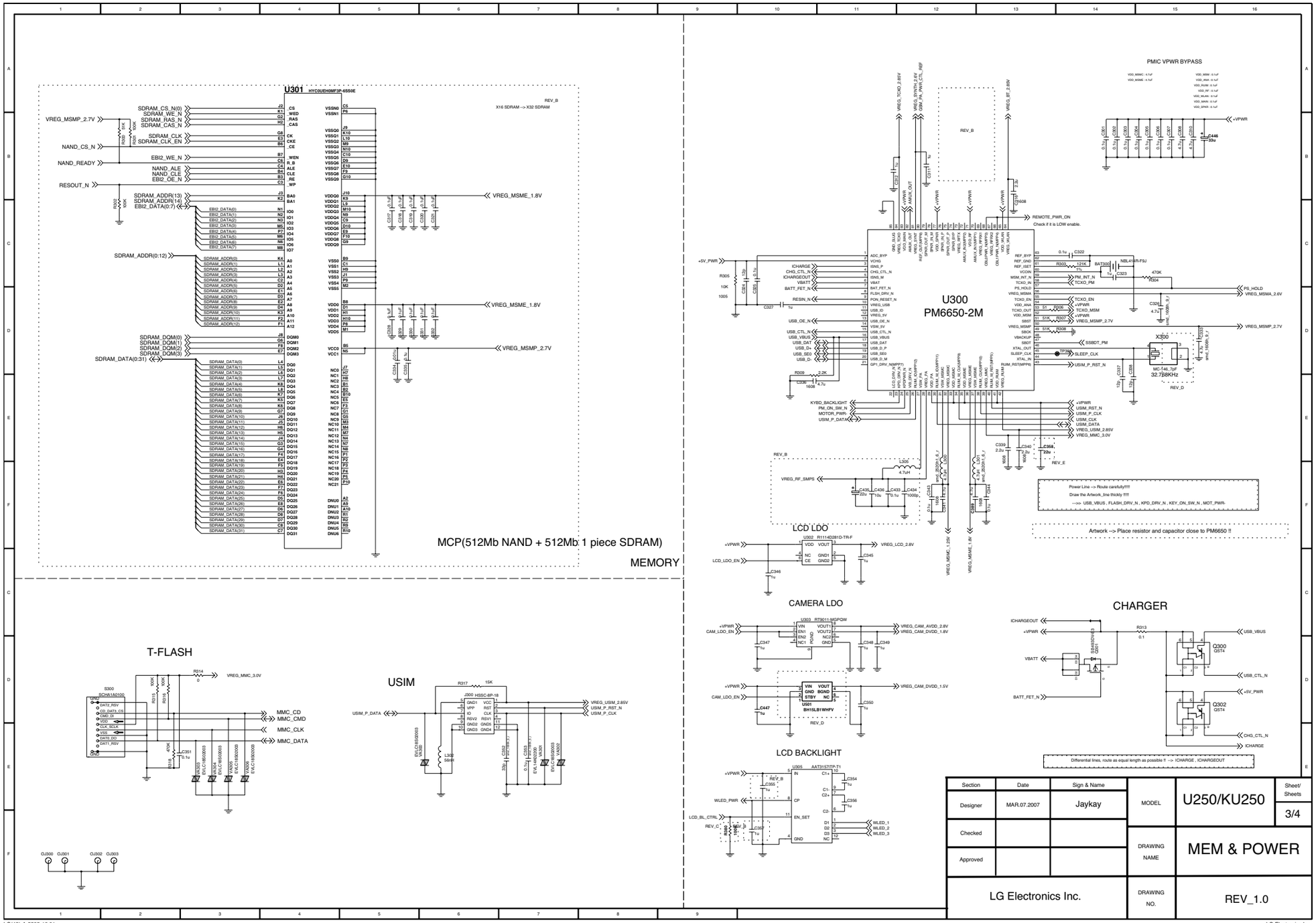
Section	Date	Sign & Name			
Designer	MAR.07.2007	Jaykay	MODEL	U250/KU250	Sheet/ Sheets 2/4
Checked			DRAWING NAME	MSM	
Approved					
LG Electronics Inc.			DRAWING NO.	REV_1.0	

LG(42)-A-5505-10:01

LG Electronics Inc.

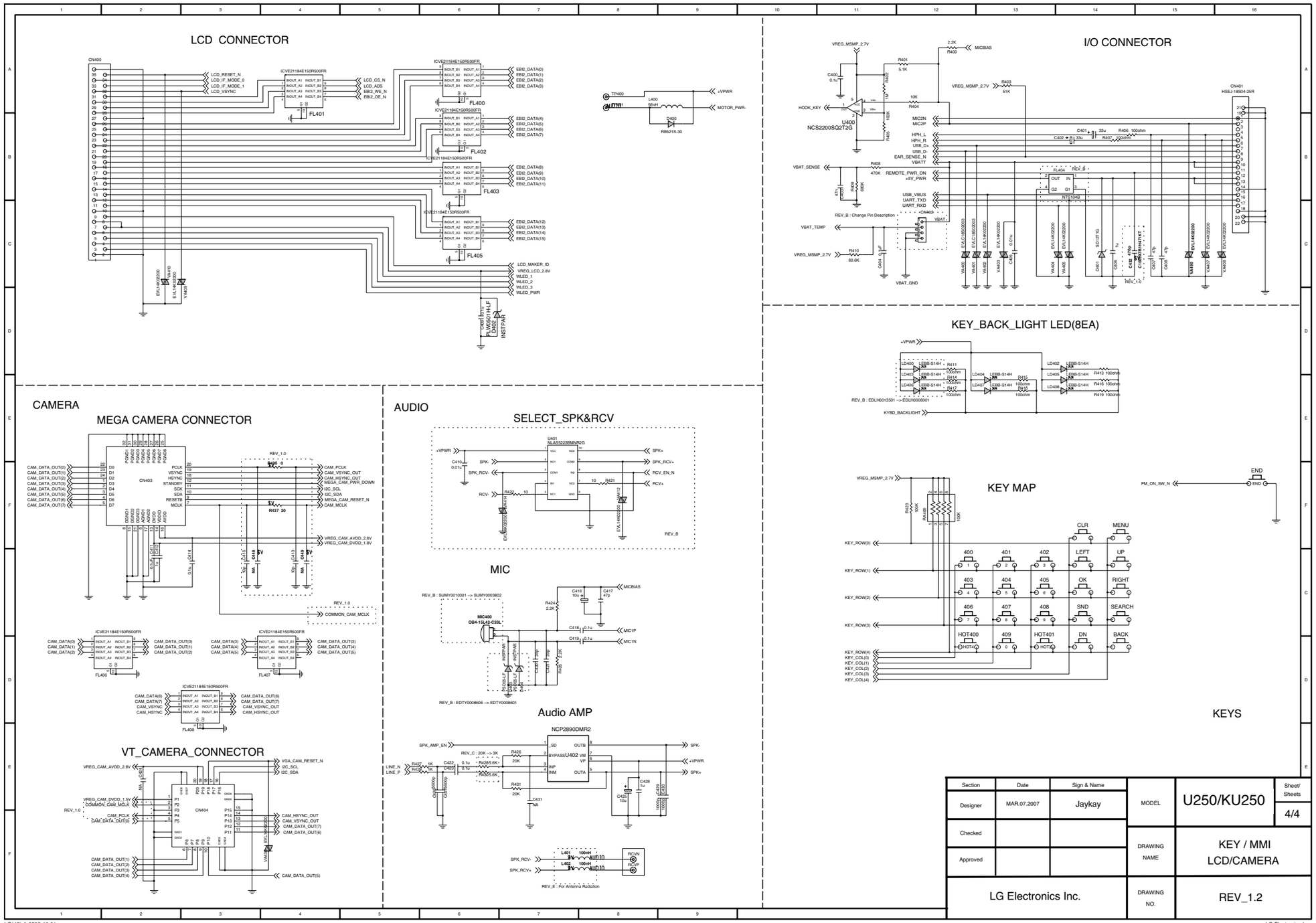
LGMC

7. CIRCUIT DIAGRAM



Section	Date	Sign & Name			
Designer	MAR.07.2007	Jaykay	MODEL	U250/KU250	Sheet/ Sheets 3/4
Checked			DRAWING NAME	MEM & POWER	
Approved					
LG Electronics Inc.			DRAWING NO.	REV_1.0	

7. CIRCUIT DIAGRAM

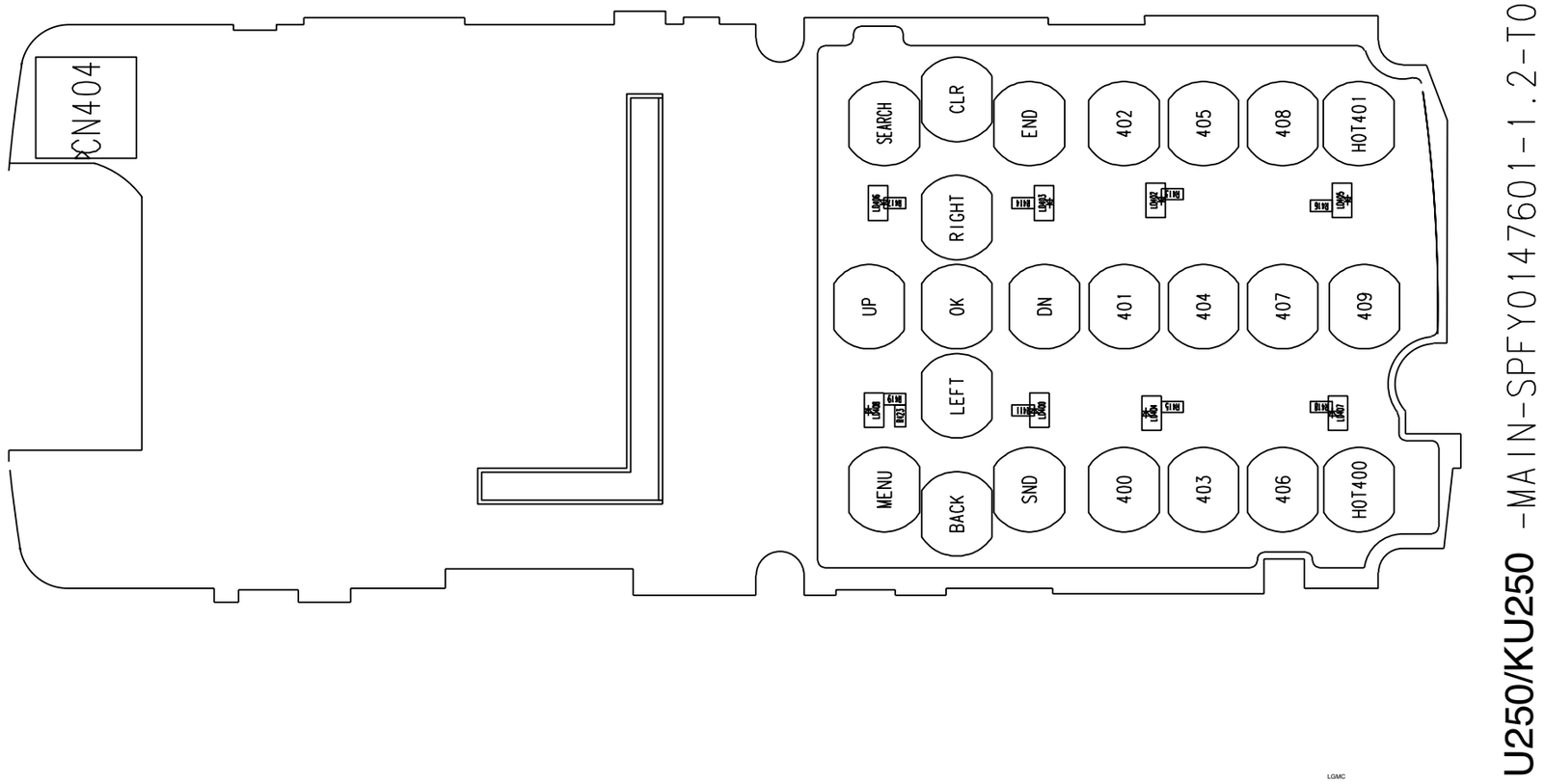


Section	Date	Sign & Name			
Designer	MAR.07.2007	Jaykay	MODEL	U250/KU250	Sheet/ Sheets 4/4
Checked			DRAWING NAME	KEY / MMI LCD/CAMERA	
Approved					
LG Electronics Inc.			DRAWING NO.	REV_1.2	

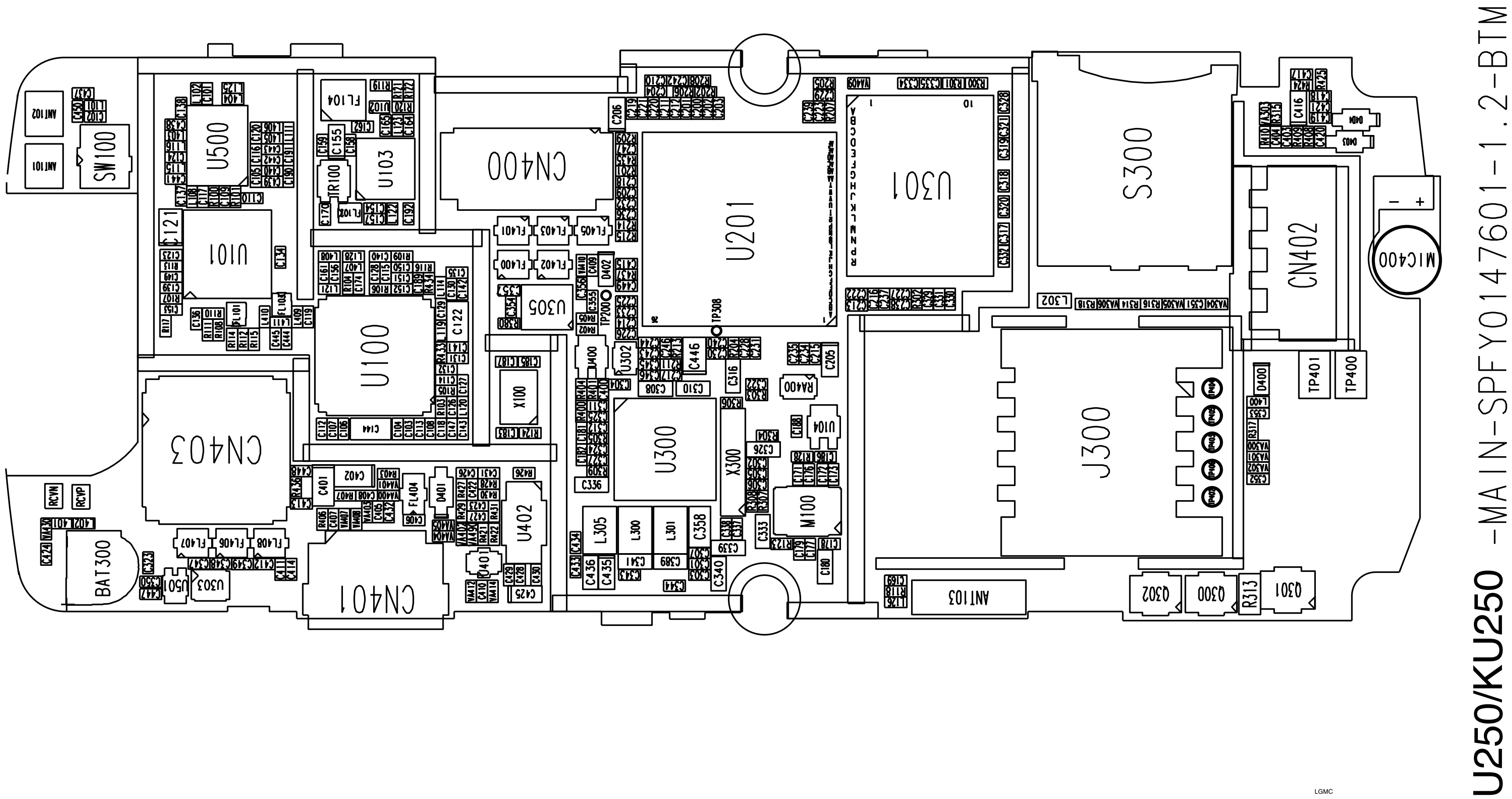
LG(42)-A-5505-10:01

LG Electronics Inc.

8. PCB LAYOUT


CN404
SEARCH
CLR
END
402
405
408
HOT401
RIGHT
UP
OK
DN
401
404
407
409
LEFT
MENU
BACK
SND
400
403
406
HOT400
LGMC
U250/KU250 -MAIN-SPFY0147601-1.2-TOP

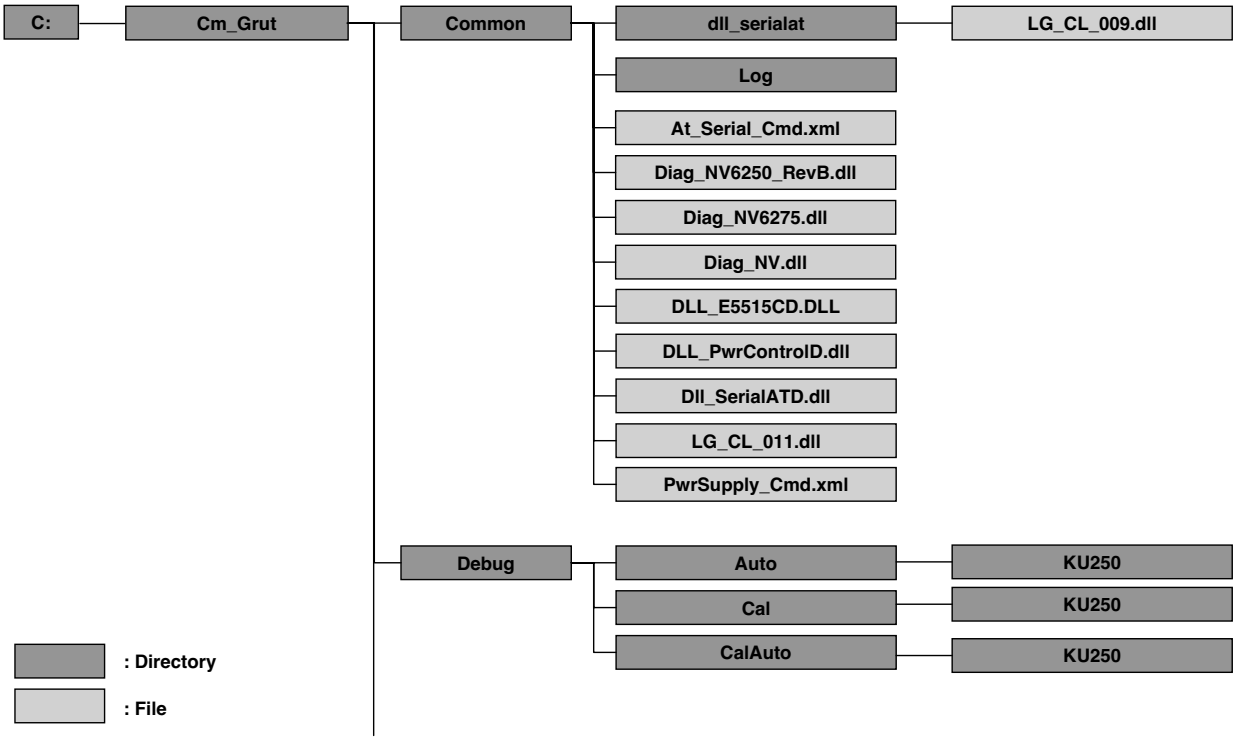
8. PCB LAYOUT


U250/KU250 -MAIN-SPFY0147601-1.2-BTM
SW100
U500
U101
U100
U103
CN400
CN403
CN401
U201
U301
S300
CN402
MIC400
J300
U300
U305
U402
M100
X300
X100
BAT300
ANT103
TP400
TP401
LGMC

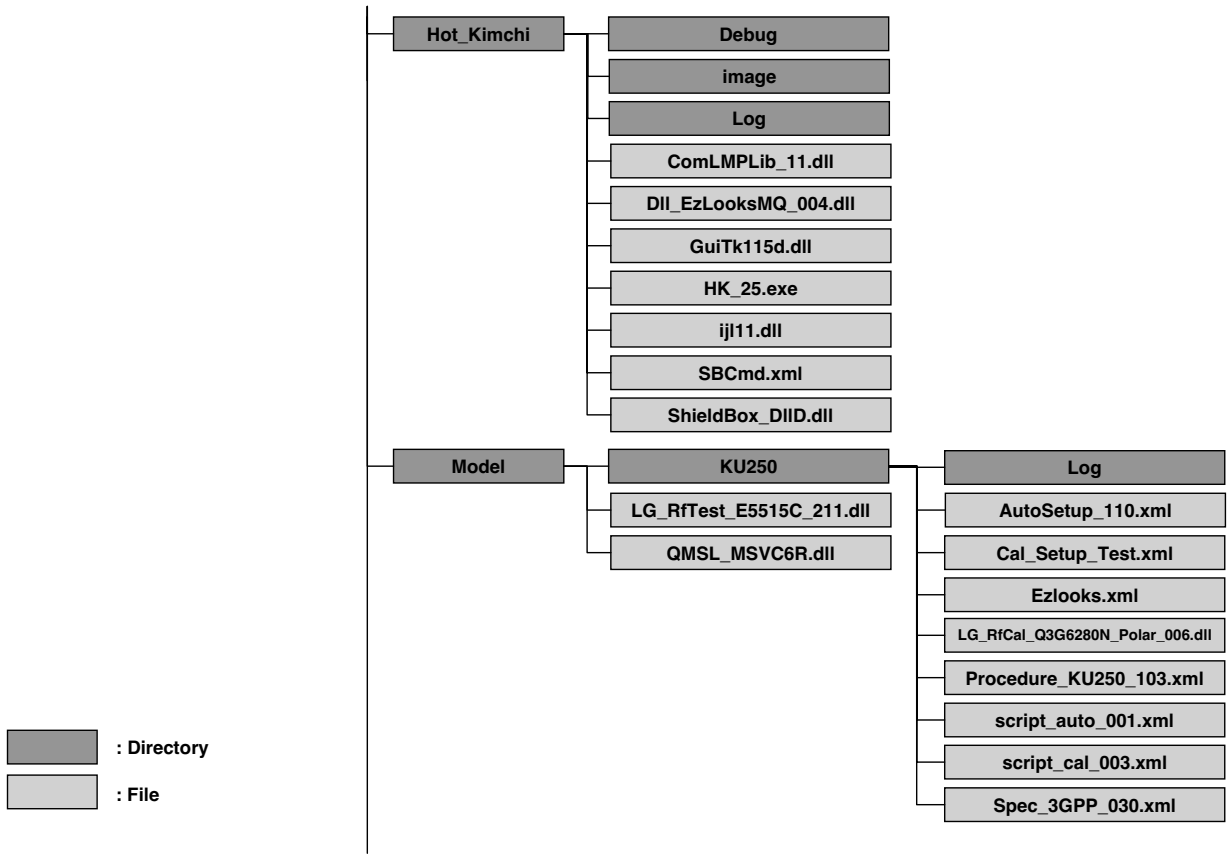
9. Calibration & RF Auto Test Program (Hot Kimchi)

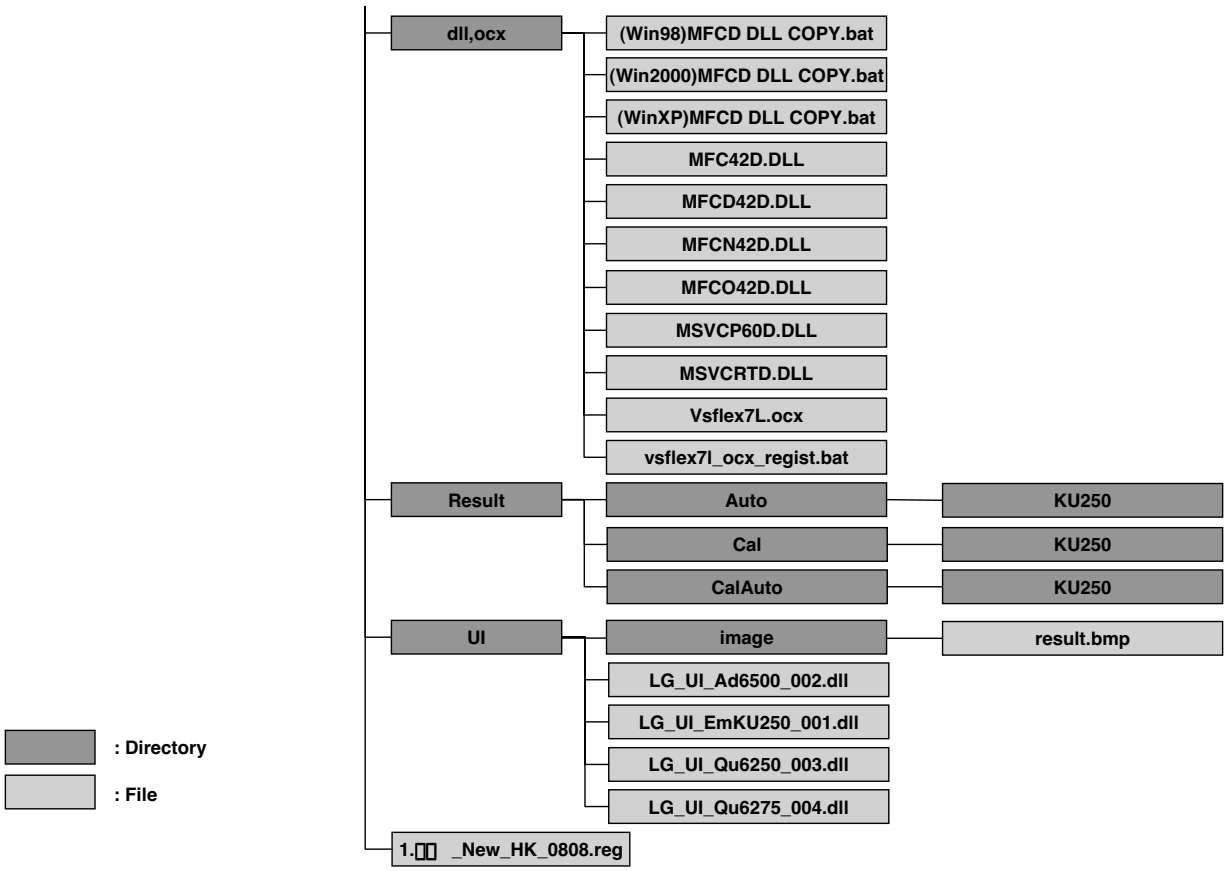
9.1 Configuration of HOT KIMCHI

9.1.1 Configuration of directory

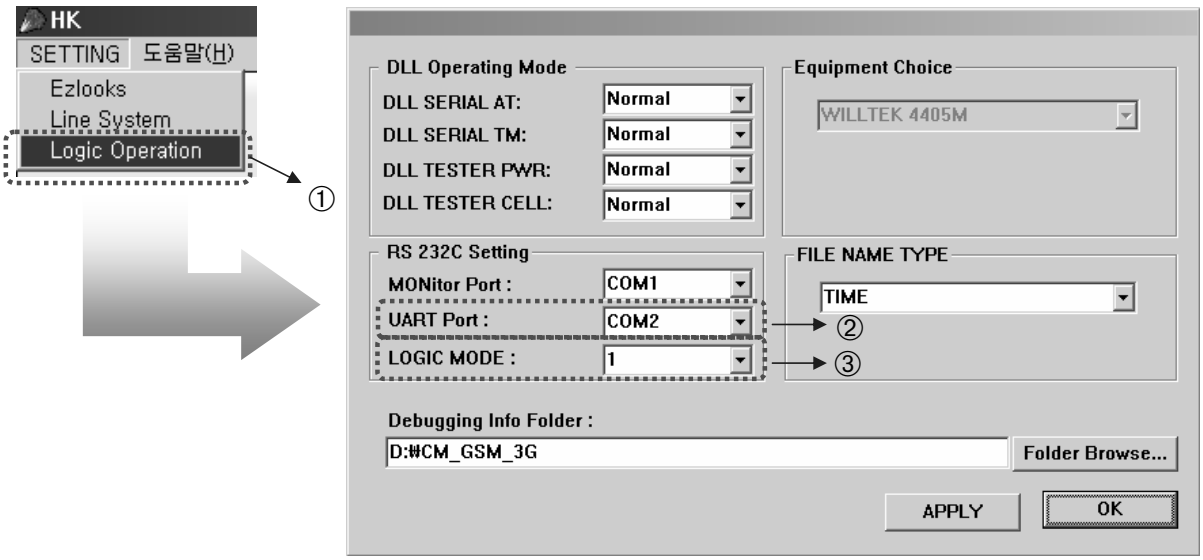


9. Calibration & RF Auto Test Program (Hot Kimchi)



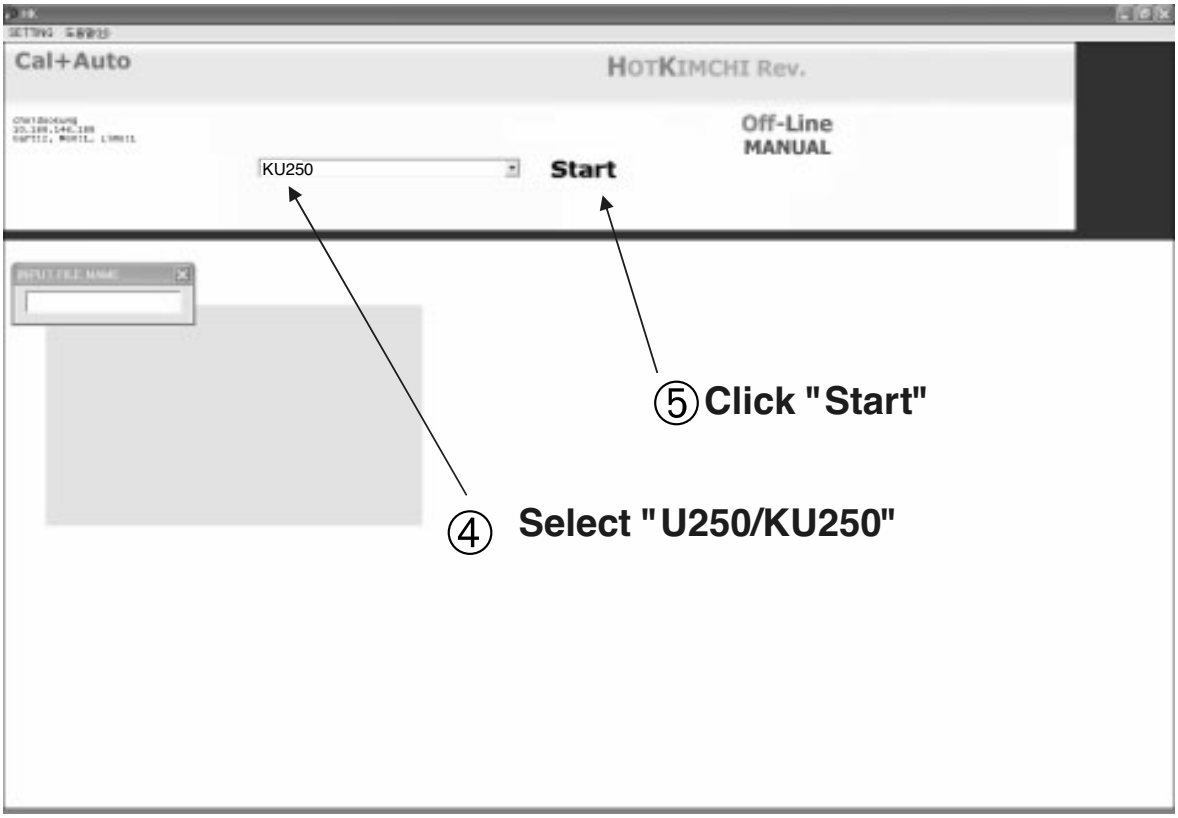

dll,ocx
(Win98)MFCD DLL COPY.bat
(Win2000)MFCD DLL COPY.bat
(WinXP)MFCD DLL COPY.bat
MFC42D.DLL
MFCD42D.DLL
MFCN42D.DLL
MFCO42D.DLL
MSVCP60D.DLL
MSVCRTD.DLL
Vsflex7L.ocx
vsflex7l_ocx_regist.bat
Result
Auto
KU250
Cal
KU250
CalAuto
KU250
UI
image
result.bmp
LG_UI_Ad6500_002.dll
LG_UI_EmKU250_001.dll
LG_UI_Qu6250_003.dll
LG_UI_Qu6275_004.dll
1.□□ _New_HK_0808.reg
: Directory
: File

9.2 How to use HOT KIMCHI



*** Procedure**

1. Click “Logic Operation” of “SETTING” menu bar
2. Select “UART Port” that PC can communicate with the phone
3. Select “LOGIC MODE” that you want
   - Logic Mode -> 1: Calibration Only



*** Procedure**

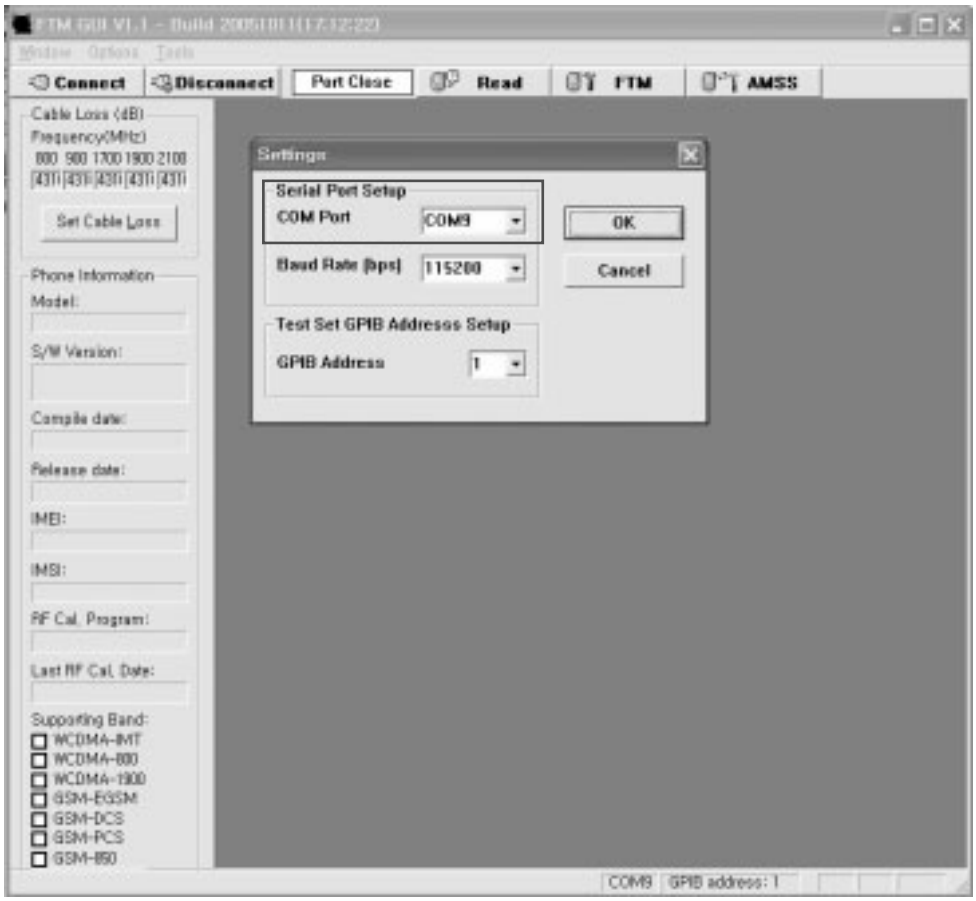
4. Select the model name “U250/KU250”

5. Click “Start” button

10. Factory Test Mode

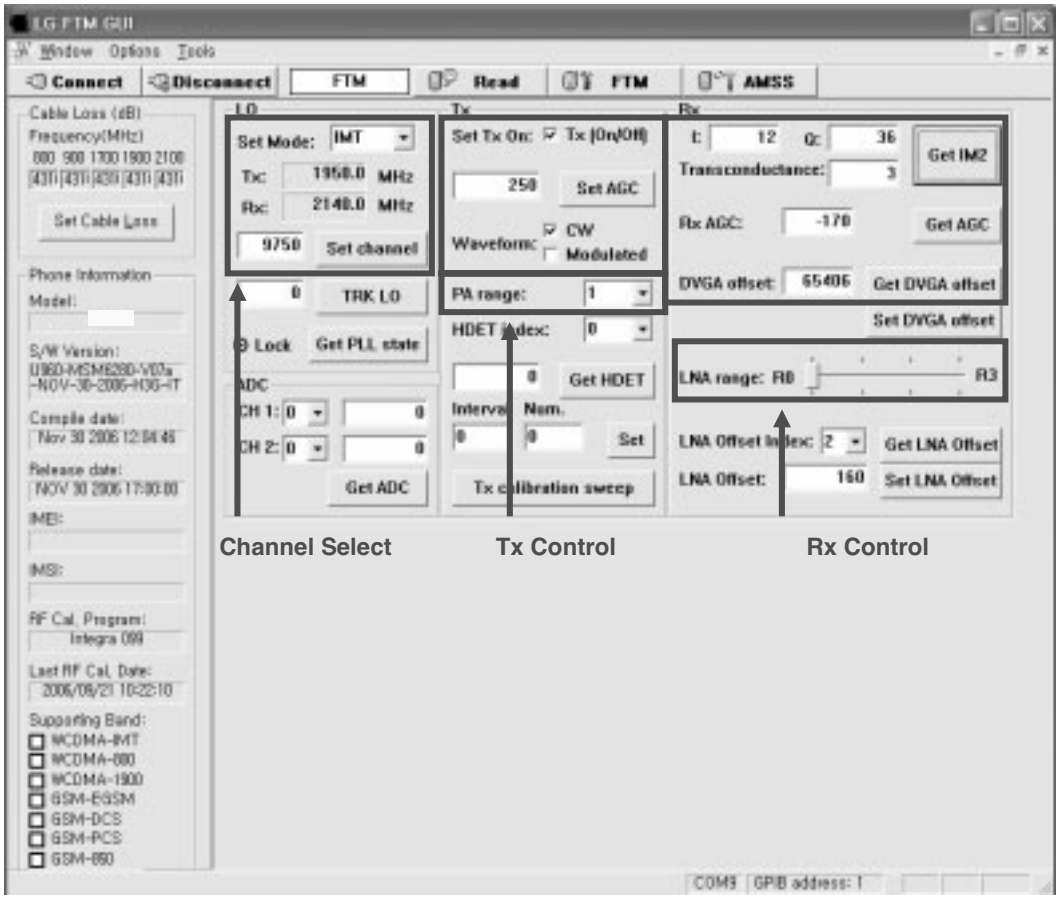
10.1. Test Program Setting

1) Open “LG FTM GUI”
2) Click “Options >> Port Settings”
3) Select Com Port and click “OK”



10.2. WCDMA Test Mode

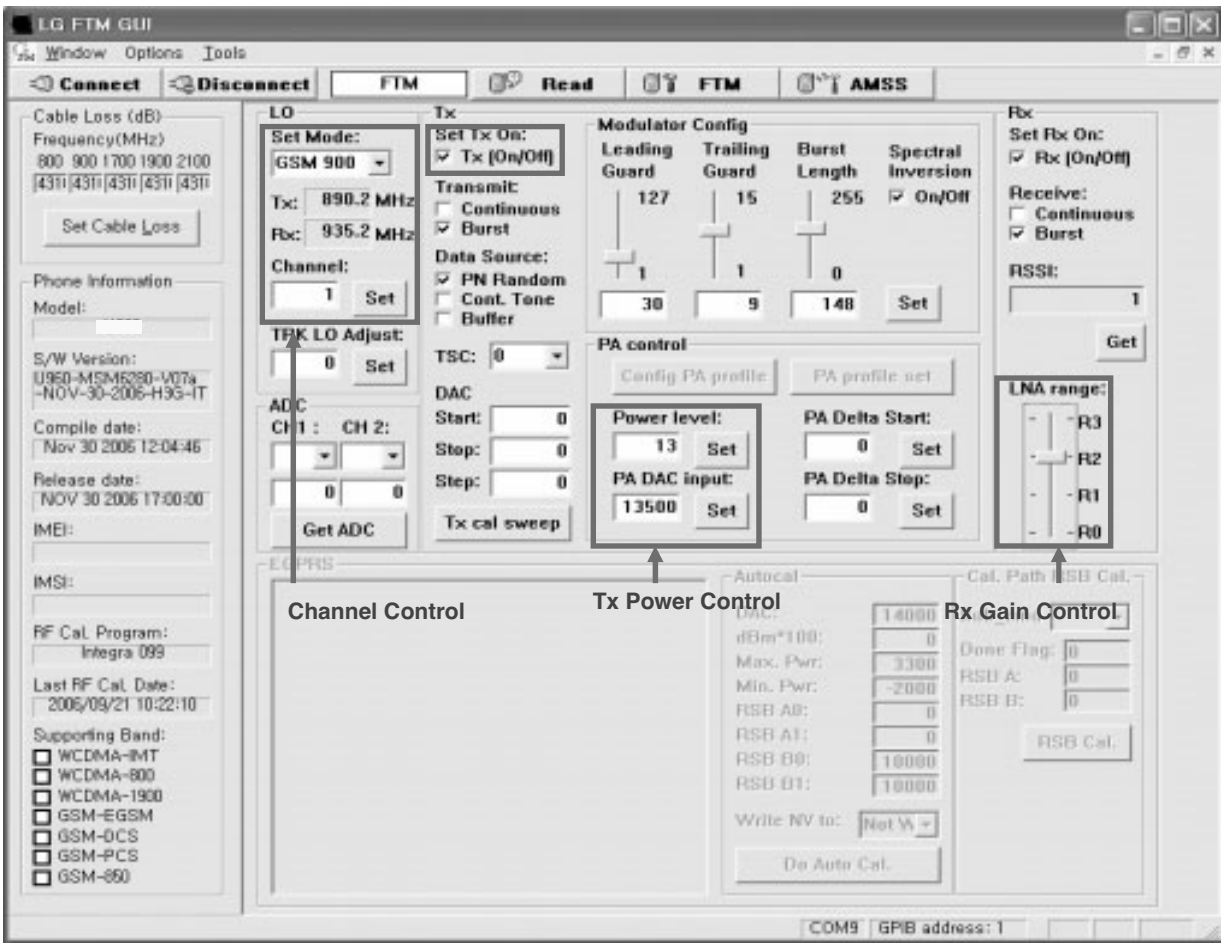
1) Click “Tools >> FTM GUI WCDMA”
2) Select “FTM” Mode
3) Select RF Frequencies, insert “9750” in “Uplink chan” and push “Enter”. Then “2140” is written at Rx UHF automatically.
4) For Deciding to “TX AGC”, insert 380 as a maximum value . And then WCDMA Power is decided.
5) To set PA Range, select ON in R1 for High power mode or select ON in R0 for Low power mode.
6) Depending on a situation, Click “Tx On” or “Tx Off”.



7) Set Rx mode. Click LNA Range, 0~4.
8) Click “Get IM2” and “Get Rx AGC”. Confirm the value.

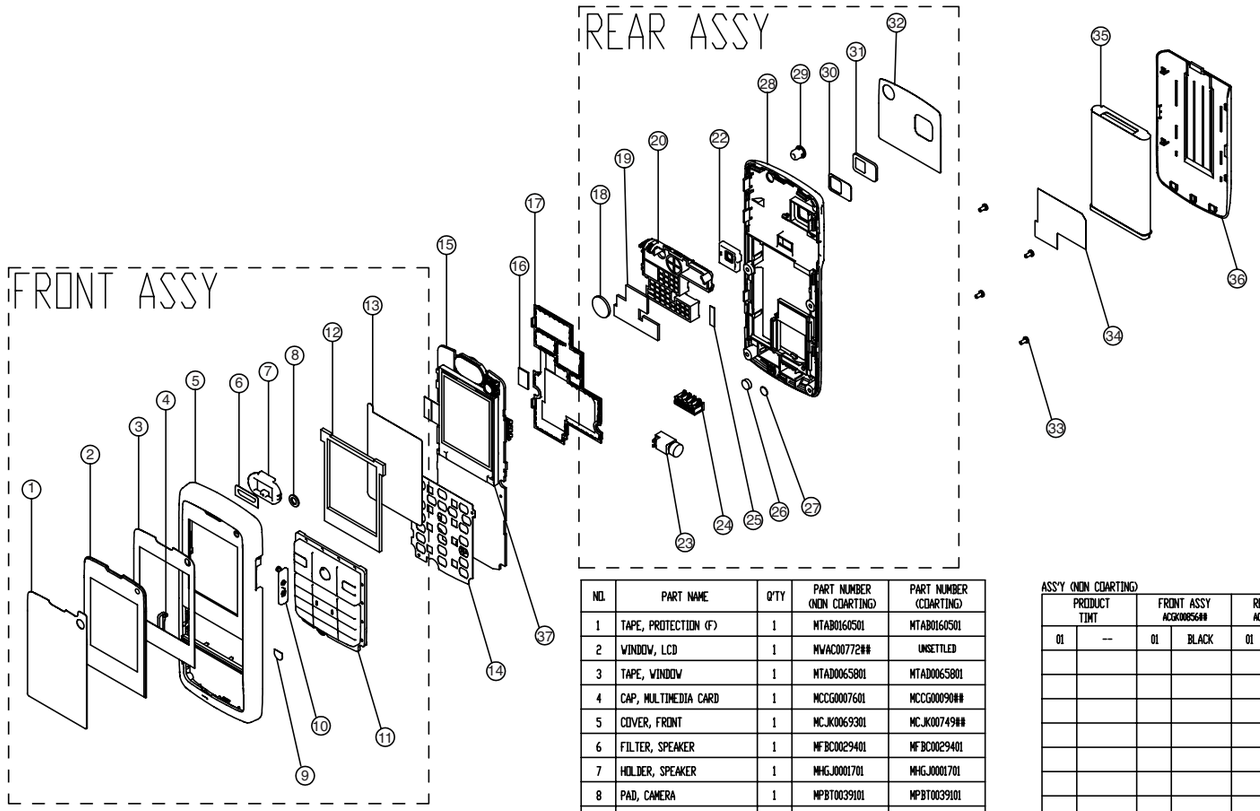
10.3. GSM Test Mode

1) To switch GSM Mode, Select Mode -> GSM mode at menu commands
2) Select RF Mode, Click “GSM” or “GSM1800” or “GSM1900”
3) Write wanted channel. We usually set “1”
4) For Deciding to “PA DAC Value”, insert 14300 as a maximum value
5) Click “Tx On” or “Tx Off”.
6) SET RX mode. Click LNA Range, 0~4.
7) Click “RX ON”



11. EXPLODED VIEW & REPLACEMENT PART LIST

11.1 EXPLODED VIEW



NO.	PART NAME	Q'TY	PART NUMBER (NON COARTING)	PART NUMBER (COARTING)
1	TAPE, PROTECTION (F)	1	MTAB0160501	MTAB0160501
2	WINDOW, LCD	1	MVAC00772##	UNSETTLED
3	TAPE, WINDOW	1	MTAD0065801	MTAD0065801
4	CAP, MULTIMEDIA CARD	1	MCCG0007601	MCCG00090##
5	COVER, FRONT	1	MCJK0069301	MCJK00749##
6	FILTER, SPEAKER	1	MFBC0029401	MFBC0029401
7	HOLDER, SPEAKER	1	MHGJ0001701	MHGJ0001701
8	PAD, CAMERA	1	MPBT0039101	MPBT0039101
9	FILTER (MIKE)	1	MFBZ0002801	MFBZ0002801
10	CAP, EARPHONE JACK	1	MCCC0043601	MCCC00469##
11	KEYPAD	1	MKAZ00359##	MKAG00015##
12	PAD, LCD	1	MPBG0058301	MPBG0058301
13	TAPE, PROTECTION (B)	1	MTAB0160601	MTAB0160601
14	DOME ASSY METAL	1	ADCA0064001	ADCA0064001
15	PCB ASSY	1	SAFY0196601	SAFY0196601
16	PAD (CONNECTOR)	1	MPBZ0179301	MPBZ0179301
17	CAN ASSY, SHIELD	1	ACKA0002101	ACKA0002101
18	PAD, SPEAKER	1	MPBN0039001	MPBN0039001
19	Pad (Shield Can)	1	MPBZ0186001	MPBZ0186001
20	ANTENNA	1	SNGF0023102	SNGF0023102
21	-	-	-	-
22	HOLDER, CAMERA	1	MHGZ0028701	MHGZ0028701
23	MOTOR	1	SJMY0007903	SJMY0007903
24	CONTACT, BATTERY	1	ENZY0019701	ENZY0019701
25	PAD	1	MPBZ0186801	MPBZ0186801
26	PAD, MIKE	1	MPBH0029101	MPBH0029101
27	LABEL, AS	1	MLAB0001102	MLAB0001102
28	COVER, REAR	1	MCJN0065501	MCJN00709##
29	CAP, MOBILE SWITCH	1	MCCF0042501	MCCF00425##
30	TAPE, WINDOW CAMERA	1	MTAD0065901	MTAD0065901
31	WINDOW, CAMERA	1	MVAE0024501	MVAE00278##
32	Tape, Protection (R)	1	MTAB0178301	MTAB0178301
33	SCREW, MACHINE BIND	4	GMEY0011201	GMEY0011201
34	Label, APPROVAL	1	MLAA00420##	MLAA00420##
35	BATTERY	1	SBPL0090501	SBPL0090501
36	COVER, BATTERY	1	MCJA0040601	MCJA00474##
37	LCD Module	1	SVLM0025001	SVLM0025001

ASS'Y (NON COARTING)

PRODUCT TIMT		FRONT ASSY ACGK00856##		REAR ASSY ACGM00875##		COVER BATTERY MCJA0040601		REMARK
01	--	01	BLACK	01	BLACK	01	BLACK	1. WINDOW LCD + UNIT 3. QUALCOMM LABEL + D 2. KEYPAD + ENGLISH

ASS'Y (COARTING)

PRODUCT TIMT		FRONT ASSY ACGK00927##		REAR ASSY ACGM00941##		COVER BATTERY MCJA0047###		REMARK
01	--	01	CHAMELEON	01	CHAMELEON	01	CHAMELEON	1. WINDOW LCD + UNIT 3. QUALCOMM LABEL + D 2. KEYPAD + ENGLISH

11.2 Replacement Parts <Mechanic component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
1		IMT,BAR/FLIP	TIMT0000614		Black	
2	AAAY00	ADDITION	AAAY0219401		Black	
3	MCJA00	COVER,BATTERY	MCJA0040601	MOLD, PC LUPOY SC-1004A, , , , ,	Without Color	36
2	APAY00	PACKAGE	APAY0095904	U250 HIT Packing(P/Label66-Angle-9501)	Without Color	
3	BSEA00	SUPPLEMENTARY PART	BSEA0003901	PACKING-LIST ENVELOPE		
2	APEY00	PHONE	APEY0394202		Black	
3	ACGK00	COVER ASSY,FRONT	ACGK0085601		Without Color	
4	MCCC00	CAP,EARPHONE JACK	MCCC0043601	COMPLEX, (empty), , , , ,	Without Color	10
4	MCCG00	CAP,MULTIMEDIA CARD	MCCG0007601	COMPLEX, (empty), , , , ,	Without Color	4
4	MCJK00	COVER,FRONT	MCJK0069301	MOLD, PC LUPOY SC-1004A, , , , ,	Without Color	5
5	MICE00	INSERT,NUT	MICE0000601	COMPLEX, (empty), , , , ,	Without Color	
5	MICE01	INSERT,NUT	MICE0000701	COMPLEX, (empty), , , , ,	Without Color	
4	MFBC00	FILTER,SPEAKER	MFBC0029401	COMPLEX, (empty), , , , ,	Without Color	6
4	MFBZ00	FILTER	MFBZ0002801	COMPLEX, (empty), , , , ,	Without Color	9
4	MHGJ00	HOLDER,SPEAKER	MHGJ0001701	COMPLEX, (empty), , , , ,	Black	7
4	MKAZ00	KEYPAD	MKAZ0035901	COMPLEX, (empty), , , , ,	Without Color	11
4	MPBG00	PAD,LCD	MPBG0058301	COMPLEX, (empty), 1.2, , , ,	Without Color	12
4	MPBT00	PAD,CAMERA	MPBT0039101	COMPLEX, (empty), 1.2, , , ,	Without Color	8
4	MTAB00	TAPE,PROTECTION	MTAB0160501	COMPLEX, (empty), , , , ,	Without Color	1
4	MTAB01	TAPE,PROTECTION	MTAB0160601	COMPLEX, (empty), , , , ,	Without Color	13
4	MTAD00	TAPE,WINDOW	MTAD0065801	COMPLEX, (empty), 0.2, , , ,	Without Color	3
4	MWAC00	WINDOW,LCD	MWAC0077201	COMPLEX, (empty), 1.0, , , ,	Without Color	2
3	ACGM00	COVER ASSY,REAR	ACGM0087501		Without Color	
4	ENZY00	CONNECTOR,ETC	ENZY0019701	4 PIN,3.0 mm,ETC , ,H=5.8		24
4	MCCF00	CAP,MOBILE SWITCH	MCCF0042501	COMPLEX, (empty), , , , ,	Black	29
4	MCJN00	COVER,REAR	MCJN0065501	MOLD, PC LUPOY SC-1004A, , , , ,	Without Color	28
4	MHGZ00	HOLDER	MHGZ0028701	COMPLEX, (empty), , , , ,	Black	22
4	MLAB00	LABEL,A/S	MLAB0001102	C2000 USASV DIA 4.0	White	27
4	MLAN00	LABEL,QUALCOMM	MLAN0000603	White,95C	Transparent	
4	MPBH00	PAD,MIKE	MPBH0029101	COMPLEX, (empty), , , , ,	Black	26
4	MPBN00	PAD,SPEAKER	MPBN0039001	CUTTING, NS, , , , ,	Black	18
4	MPBZ00	PAD	MPBZ0186001	COMPLEX, (empty), , , , ,	Without Color	19
4	MPBZ01	PAD	MPBZ0186801	COMPLEX, (empty), , , , ,	Without Color	25

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
4	MTAB01	TAPE,PROTECTION	MTAB0178301	COMPLEX, (empty), , , , ,	Without Color	32
4	MTAD00	TAPE,WINDOW	MTAD0065901	COMPLEX, (empty), 0.2, , , ,	Without Color	30
4	MWAE00	WINDOW,CAMERA	MWAE0024501	COMPLEX, (empty), 1.0, , , ,	Without Color	31
4	SJMY00	VIBRATOR,MOTOR	SJMY0007903	3 V,0.85 A,4*8 ,Height 5.8T Cylinder ,; ,3V , , ,11000 , , , ,		23
4	SNGF00	ANTENNA,GSM,FIXED	SNGF0023102	3.0 ,-2 dBd, ,EGSM+DCS+PCS+W-BAND I, INTERNAL ,; ,QUAD ,-2.0 ,50 ,3.0		20
3	MLAA00	LABEL,APPROVAL	MLAA0042001	COMPLEX, (empty), , , , ,	Without Color	34
6	MCBA00	CAN,SHIELD	MCBA0017101	COMPLEX, (empty), , , , ,	Without Color	
6	MPBZ00	PAD	MPBZ0179301	COMPLEX, (empty), 0.6t, , , ,	Without Color	16
5	ADCA00	DOME ASSY,METAL	ADCA0064001		Without Color	14
5	MTAZ00	TAPE	MTAZ0186301	COMPLEX, (empty), 0.1, , , ,	Without Color	
5	MLAZ00	LABEL	MLAZ0038301	PID Label 4 Array	Without Color	

11.2 Replacement Parts <Main component>

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
3	GMEY00	SCREW MACHINE,BIND	GMEY0011201	1.4 mm,3 mm,MSWR3(BK) ,N ,+ ,NYLOK	Without Color	33
3	SAFY00	PCB ASSY,MAIN	SAFY0196602			15
4	SAFB00	PCB ASSY,MAIN,INSERT	SAFB0072901			
5	ACKA00	CAN ASSY,SHIELD	ACKA0002101		Without Color	17
5	SUMY00	MICROPHONE	SUMY0010301	FPCB ,-42 dB,4*1.5T ,Standard Holder		
5	SUSY00	SPEAKER	SUSY0026801	ASSY ,8 ohm,88 dB, mm,wire 15mm ,; , , , , , ,18*10*3T ,WIRE		
5	SVCY00	CAMERA	SVCY0014401	CMOS ,MEGA ,1.3M, Magnachip(1/4"), 8x8x5t, Socket Type		
5	SVCY01	CAMERA	SVCY0014301	CMOS ,VGA ,Socket type		
5	SVLM00	LCD MODULE	SVLM0025001	MAIN ,176*220 (1.76") ,34*46.7*2.5(T) ,262k ,TFT ,TM ,NT3916(Novatek) ,NTSC:60%		
4	SAFF00	PCB ASSY,MAIN,SMT	SAFF0117802			
5	SAFC00	PCB ASSY,MAIN,SMT BOTTOM	SAFC0088501			
6	ANT103	ANTENNA,GSM,FIXED	SNGF0026001	3.0 ,-2.0 dBd, ,Bluetooth, SMD, 8.0*2.0*1.2 ,; ,SINGLE ,-2.0 ,50 ,3.0		
6	BAT300	BATTERY,CELL,LITHIUM	SBCL0001701	2 V,0.5 mAh,CYLINDER ,Reflow type BB, Max T 1.67, phi 4.8, Pb-Free		
6	C101	CAP,CHIP,MAKER	ECZH0000841	56 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C103	CAP,CERAMIC,CHIP	ECCH0001002	180 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C104	CAP,CERAMIC,CHIP	ECCH0001002	180 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C106	CAP,CHIP,MAKER	ECZH0000846	8.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C107	CAP,CERAMIC,CHIP	ECCH0000107	6 pF,50V,D,NP0,TC,1005,R/TP		
6	C108	CAP,CERAMIC,CHIP	ECCH0001002	180 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C109	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C110	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C112	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C113	CAP,CERAMIC,CHIP	ECCH0001002	180 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C114	CAP,CERAMIC,CHIP	ECCH0000149	3.3 nF,50V,K,X7R,HD,1005,R/TP		
6	C115	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C117	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C118	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C119	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C121	CAP,TANTAL,CHIP,MAKER	ECTZ0005603	33 uF,10V ,M ,L_ESR ,2125 ,R/TP ,; , ,[empty] ,[empty] ,[empty] , ,[empty] ,[empty] ,[empty] ,[empty]		
6	C122	CAP,CERAMIC,CHIP	ECCH0000393	22 uF,6.3V ,M ,X5R ,HD ,2012 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C123	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C124	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C126	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C127	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C128	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C129	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C130	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C131	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C132	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C134	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C135	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C136	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C139	CAP,CHIP,MAKER	ECZH0000844	68 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C140	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C141	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C142	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C143	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C144	CAP,CERAMIC,CHIP	ECCH0000393	22 uF,6.3V ,M ,X5R ,HD ,2012 ,R/TP		
6	C147	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C149	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C150	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C151	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C152	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C153	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C154	CAP,CHIP,MAKER	ECZH0000802	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C155	CAP,TANTAL,CHIP	ECTH0002202	4.7 uF,10V ,M ,STD ,1608 ,R/TP		
6	C156	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C157	INDUCTOR,CHIP	ELCH0001427	2.2 nH,S ,1005 ,R/TP ,Pb Free		
6	C158	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C159	CAP,CERAMIC,CHIP	ECCH0000112	15 pF,50V,J,NP0,TC,1005,R/TP		
6	C161	CAP,CERAMIC,CHIP	ECCH0000901	2.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C162	CAP,CERAMIC,CHIP	ECCH0000180	3.3 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C164	CAP,CERAMIC,CHIP	ECCH0000101	.5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C165	CAP,CERAMIC,CHIP	ECCH0000101	.5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C170	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C171	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C172	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C173	CAP,CERAMIC,CHIP	ECCH0000198	2.2 uF,6.3V ,M ,X5R ,TC ,1005 ,R/TP		
6	C174	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C176	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C177	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C178	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C179	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C180	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C181	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C182	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C183	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C185	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C186	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C187	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C188	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C189	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	C190	CAP,CERAMIC,CHIP	ECCH0000101	.5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C192	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C200	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C201	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C202	CAP,CHIP,MAKER	ECZH0001211	220 nF,10V ,Z ,Y5V ,HD ,1005 ,R/TP		
6	C203	CAP,CHIP,MAKER	ECZH0001211	220 nF,10V ,Z ,Y5V ,HD ,1005 ,R/TP		
6	C204	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C205	CAP,TANTAL,CHIP,MAKER	ECTZ0004701	4.7 uF,6.3V ,M ,STD ,1608 ,R/TP		
6	C206	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ESR ,1608 ,R/TP		
6	C209	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C210	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C211	CAP,CERAMIC,CHIP	ECCH0000179	22 nF,16V ,K ,X5R ,HD ,1005 ,R/TP		
6	C212	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C213	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C214	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C215	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C216	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C217	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C218	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C219	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C220	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C221	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C222	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C223	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C225	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C226	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C227	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C228	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C229	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C230	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C231	CAP,CERAMIC,CHIP	ECCH0000147	2.2 nF,50V,K,X7R,HD,1005,R/TP		
6	C232	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C233	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C234	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C235	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C236	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C237	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C238	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C239	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C240	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C242	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C243	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C244	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C246	CAP,CERAMIC,CHIP	ECCH0000161	33 nF,16V,K,X7R,HD,1005,R/TP		
6	C247	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C301	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C302	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C303	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C304	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C305	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C306	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C307	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C308	CAP,CERAMIC,CHIP	ECCH0007801	4.7 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP		
6	C310	CAP,CERAMIC,CHIP	ECCH0007801	4.7 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP		
6	C311	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C312	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C316	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C317	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C318	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C319	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C320	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C321	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C322	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C323	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C324	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C325	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C326	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C327	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C328	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C329	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C330	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C331	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C332	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C333	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C334	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C335	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C336	CAP,CERAMIC,CHIP	ECCH0007801	4.7 uF,10V ,Z ,Y5V ,HD ,1608 ,R/TP		
6	C337	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C338	CAP,CHIP,MAKER	ECZH0000816	12 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C339	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C340	CAP,CERAMIC,CHIP	ECCH0005602	2.2 uF,16V ,K ,X5R ,HD ,1608 ,R/TP		
6	C341	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C343	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C344	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C345	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C346	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C347	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C348	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C349	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C350	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C351	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C352	CAP,CHIP,MAKER	ECZH0000830	33 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C353	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C354	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C355	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C356	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C357	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C358	CAP,CERAMIC,CHIP	ECCH0000393	22 uF,6.3V ,M ,X5R ,HD ,2012 ,R/TP		
6	C389	CAP,CERAMIC,CHIP	ECCH0006201	4.7 uF,6.3V ,K ,X5R ,TC ,1608 ,R/TP		
6	C400	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C401	CAP,TANTAL,CHIP	ECTH0004402	33 uF,6.3V ,M ,L_ESR ,2012 ,R/TP		
6	C402	CAP,TANTAL,CHIP	ECTH0004402	33 uF,6.3V ,M ,L_ESR ,2012 ,R/TP		
6	C403	CAP,CERAMIC,CHIP	ECCH0002002	47000 pF,10V ,K ,B ,HD ,1005 ,R/TP		
6	C404	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C405	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C406	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C407	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C408	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C409	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C410	CAP,CERAMIC,CHIP	ECCH0000155	10 nF,16V,K,X7R,HD,1005,R/TP		
6	C411	CAP,CHIP,MAKER	ECZH0004402	0.1 uF,16V ,Z ,NP0 ,TC ,1005 ,R/TP		
6	C412	CAP,CERAMIC,CHIP	ECCH0004904	1 uF,6.3V ,K ,X5R ,TC ,1005 ,R/TP		
6	C413	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C414	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C415	CAP,CERAMIC,CHIP	ECCH0000110	10 pF,50V,D,NP0,TC,1005,R/TP		
6	C416	CAP,TANTAL,CHIP	ECTH0003701	10 uF,6.3V ,M ,L_ESR ,1608 ,R/TP		
6	C417	CAP,CERAMIC,CHIP	ECCH0000122	47 pF,50V,J,NP0,TC,1005,R/TP		
6	C418	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C419	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C420	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C421	CAP,CERAMIC,CHIP	ECCH0000120	39 pF,50V,J,NP0,TC,1005,R/TP		
6	C422	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C423	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C425	CAP,TANTAL,CHIP	ECTH0001902	10 uF,10V ,M ,L_ESR ,1608 ,R/TP		
6	C426	CAP,CERAMIC,CHIP	ECCH0000152	5.6 nF,25V,K,X7R,HD,1005,R/TP		
6	C427	CAP,CERAMIC,CHIP	ECCH0000152	5.6 nF,25V,K,X7R,HD,1005,R/TP		
6	C428	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C429	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C430	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C432	CAP,CHIP,MAKER	ECZH0001121	470 pF,50V ,K ,X7R ,HD ,1005 ,R/TP		
6	C433	CAP,CERAMIC,CHIP	ECCH0000182	0.1 uF,10V ,K ,X5R ,HD ,1005 ,R/TP		
6	C434	CAP,CERAMIC,CHIP	ECCH0000143	1 nF,50V,K,X7R,HD,1005,R/TP		
6	C435	CAP,TANTAL,CHIP	ECTH0001903	22 uF,6.3V ,M ,L_ESR ,1608 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	C436	CAP,CERAMIC,CHIP	ECCH0005604	10 uF,6.3V ,M ,X5R ,TC ,1608 ,R/TP		
6	C437	CAP,CHIP,MAKER	ECZH0000802	1 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C438	CAP,CHIP,MAKER	ECZH0000813	100 pF,50V ,J ,NP0 ,TC ,1005 ,R/TP		
6	C439	CAP,CHIP,MAKER	ECZH0000806	5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C440	CAP,CHIP,MAKER	ECZH0000806	5 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C441	CAP,CERAMIC,CHIP	ECCH0000185	5.6 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C442	CAP,CERAMIC,CHIP	ECCH0000185	5.6 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C443	CAP,CERAMIC,CHIP	ECCH0000185	5.6 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C444	CAP,CERAMIC,CHIP	ECCH0000901	2.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C445	CAP,CERAMIC,CHIP	ECCH0000901	2.2 pF,50V ,C ,NP0 ,TC ,1005 ,R/TP		
6	C446	CAP,TANTAL,CHIP,MAKER	ECTZ0005603	33 uF,10V ,M ,L_ESR ,2125 ,R/TP ,; , ,[empty] ,[empty] , ,[empty] , ,[empty] ,[empty] ,[empty] ,[empty]		
6	C447	CAP,CHIP,MAKER	ECZH0001215	1 uF,10V ,K ,X5R ,TC ,1005 ,R/TP		
6	C450	CAP,CERAMIC,CHIP	ECCH0000115	22 pF,50V,J,NP0,TC,1005,R/TP		
6	CN400	CONNECTOR,FFC/FPC	ENQY0010901	35 PIN,0.3 mm,ETC , ,H=1.2		
6	CN401	CONNECTOR,I/O	ENRY0006401	18 PIN,0.4 mm,ANGLE , ,H=2.5, Reverse Type		
6	CN403	CONN,SOCKET	ENSY0020101	24 PIN,ETC , ,0.9 mm,		
6	D400	DIODE,SWITCHING	EDSY0011901	EMD2 ,30 V,1 A,R/TP ,VF=1.5V(IF=200mA) , IR=30uA(VR=10V)		
6	D401	DIODE,TVS	EDTY0007401	SMD ,12 V,350 W,R/TP ,		
6	D402	DIODE,TVS	EDTY0008610	SOD-523 ,5 V,250 W,R/TP ,PB-FREE		
6	D403	DIODE,TVS	EDTY0008601	SOD-323 ,6 V,400 W,R/TP ,PB-FREE		
6	D404	DIODE,TVS	EDTY0008601	SOD-323 ,6 V,400 W,R/TP ,PB-FREE		
6	FL101	FILTER,SAW	SFSY0030201	897.5 MHz,1.4*1.1*0.6 ,SMD ,Pb-free_SAW_GSM900_Tx		
6	FL102	FILTER,SAW	SFSY0031101	1950 MHz,1.4*1.1*0.62 ,SMD ,RF Filter for WCDMA 2Ghz ,; ,1950 ,1.4*1.1*0.62 ,SMD ,P/TR		
6	FL103	FILTER,SAW	SFSY0031201	2140 MHz,1.4*1.1*0.62 ,SMD ,2110M~2170M, IL 2.0, 5pin, U-B, 50-100_10, WCDMA BAND I Rx ,; ,2140 ,1.4*1.1*0.62 ,SMD ,R/TP		
6	FL104	DUPLEXER,IMT	SDMY0001301	1950 MHz,2140 MHz,1.6 dB,2.0 dB,53 dB,44 dB,3.0*2.5*1.2 ,SMD ,FBAR, WCDMA duplexer ,; ,2140 ,44 ,1950 ,53 ,2.0 ,1.6 ,3.0X2.5X1.2 ,DUAL ,SMD ,R/TP		
6	FL400	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL401	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL402	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL403	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL404	FILTER,EMI/POWER	SFEY0006001	SMD ,		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	FL405	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL406	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL407	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	FL408	FILTER,EMI/POWER	SFEY0007103	SMD ,18 V, ,SMD ,4ch. R-Varistor Array(50Ohm,15pF), Pb-free		
6	J300	CONN,SOCKET	ENSY0019201	8 PIN,ETC ,8Pin ,2.54 mm,Korean 8Pin Stopper UIM		
6	L102	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,		
6	L108	INDUCTOR,CHIP	ELCH0001031	15 nH,J ,1005 ,R/TP ,PBFREE		
6	L111	INDUCTOR,CHIP	ELCH0004718	5.6 nH,S ,1005 ,R/TP ,		
6	L114	INDUCTOR,CHIP	ELCH0003813	47 nH,J ,1005 ,R/TP ,COIL TYPE		
6	L115	INDUCTOR,CHIP	ELCH0001032	18 nH,J ,1005 ,R/TP ,PBFREE		
6	L116	INDUCTOR,CHIP	ELCH0001041	10 nH,S ,1005 ,R/TP ,PBFREE		
6	L119	INDUCTOR,CHIP	ELCH0003813	47 nH,J ,1005 ,R/TP ,COIL TYPE		
6	L120	INDUCTOR,CHIP	ELCH0003813	47 nH,J ,1005 ,R/TP ,COIL TYPE		
6	L121	INDUCTOR,CHIP	ELCH0005020	1 nH,S ,1005 ,R/TP ,		
6	L123	INDUCTOR,CHIP	ELCH0005020	1 nH,S ,1005 ,R/TP ,		
6	L125	INDUCTOR,CHIP	ELCH0001410	12 nH,J ,1005 ,R/TP ,Pb Free		
6	L128	INDUCTOR,CHIP	ELCH0005010	1.8 nH,S ,1005 ,R/TP ,		
6	L300	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L301	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L302	INDUCTOR,CHIP	ELCH0001550	56 nH,J ,1608 ,R/TP ,		
6	L305	INDUCTOR,SMD,POWER	ELCP0008001	4.7 uH,M ,2.5*2.0*1.0 ,R/TP ,		
6	L400	INDUCTOR,CHIP	ELCH0003825	56 nH,J ,1005 ,R/TP ,chip inductor,PBFREE		
6	L401	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,		
6	L402	INDUCTOR,CHIP	ELCH0005009	100 nH,J ,1005 ,R/TP ,		
6	L403	INDUCTOR,CHIP	ELCH0001033	1.5 nH,S ,1005 ,R/TP ,PBFREE		
6	L404	INDUCTOR,CHIP	ELCH0005010	1.8 nH,S ,1005 ,R/TP ,		
6	L405	INDUCTOR,CHIP	ELCH0005002	2.7 nH,S ,1005 ,R/TP ,		
6	L406	INDUCTOR,CHIP	ELCH0005002	2.7 nH,S ,1005 ,R/TP ,		
6	L407	INDUCTOR,CHIP	ELCH0005002	2.7 nH,S ,1005 ,R/TP ,		
6	L408	INDUCTOR,CHIP	ELCH0001041	10 nH,S ,1005 ,R/TP ,PBFREE		
6	L409	INDUCTOR,CHIP	ELCH0001035	4.7 nH,S ,1005 ,R/TP ,PBFREE		
6	L410	INDUCTOR,CHIP	ELCH0001035	4.7 nH,S ,1005 ,R/TP ,PBFREE		
6	L411	INDUCTOR,CHIP	ELCH0001035	4.7 nH,S ,1005 ,R/TP ,PBFREE		
6	M100	MODULE,ETC	SMZY0012601	4.5x3.2x1.2 Bluetooth RF Module		
6	Q300	TR,BJT,PNP	EQBP0009901	TSMT6 ,0.5 W,R/TP ,Vceo=-12V, Ic=-3A, hFE=270~680		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	Q301	TR,FET,P-CHANNEL	EQFP0004701	TSOP6 ,1.5 W,20 V,-5 A,R/TP ,P-CHANNEL 20-V(D-S) MOSFET, Pb free		
6	Q302	TR,BJT,PNP	EQBP0009901	TSMT6 ,0.5 W,R/TP ,Vceo=-12V, Ic=-3A, hFE=270~680		
6	R100	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R101	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R103	RES,CHIP,MAKER	ERHZ0000212	12 Kohm,1/16W ,F ,1005 ,R/TP		
6	R104	RES,CHIP,MAKER	ERHZ0000310	680 ohm,1/16W ,F ,1005 ,R/TP		
6	R105	RES,CHIP,MAKER	ERHZ0003801	5.1 ohm,1/16W ,J ,1005 ,R/TP		
6	R106	RES,CHIP,MAKER	ERHZ0003801	5.1 ohm,1/16W ,J ,1005 ,R/TP		
6	R107	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R108	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R109	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R110	RES,CHIP,MAKER	ERHZ0000517	91 ohm,1/16W ,J ,1005 ,R/TP		
6	R111	RES,CHIP,MAKER	ERHZ0000517	91 ohm,1/16W ,J ,1005 ,R/TP		
6	R112	RES,CHIP,MAKER	ERHZ0000473	39 ohm,1/16W ,J ,1005 ,R/TP		
6	R113	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R114	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R115	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R116	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R117	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R118	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R119	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R120	RES,CHIP,MAKER	ERHZ0000483	47 ohm,1/16W ,J ,1005 ,R/TP		
6	R121	RES,CHIP,MAKER	ERHZ0000415	130 ohm,1/16W ,J ,1005 ,R/TP		
6	R122	RES,CHIP,MAKER	ERHZ0000415	130 ohm,1/16W ,J ,1005 ,R/TP		
6	R123	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R124	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R128	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R201	RES,CHIP,MAKER	ERHZ0000222	150 Kohm,1/16W ,F ,1005 ,R/TP		
6	R202	RES,CHIP,MAKER	ERHZ0000469	36 ohm,1/16W ,J ,1005 ,R/TP		
6	R204	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R205	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R207	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R208	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R209	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R211	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R213	RES,CHIP,MAKER	ERHZ0000437	2 Kohm,1/16W ,J ,1005 ,R/TP		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R214	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R215	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R300	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R301	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R302	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R303	RES,CHIP,MAKER	ERHZ0004201	121000 ohm,1/16W ,F ,1005 ,R/TP		
6	R304	RES,CHIP,MAKER	ERHZ0000487	470 Kohm,1/16W ,J ,1005 ,R/TP		
6	R305	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R306	RES,CHIP,MAKER	ERHZ0000490	51 ohm,1/16W ,J ,1005 ,R/TP		
6	R307	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R308	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R309	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R313	RES,CHIP	ERHY0008602	0.1 ohm,1/4W ,J ,2012 ,R/TP		
6	R314	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R315	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R316	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R317	RES,CHIP,MAKER	ERHZ0000422	15 Kohm,1/16W ,J ,1005 ,R/TP		
6	R318	RES,CHIP,MAKER	ERHZ0000487	470 Kohm,1/16W ,J ,1005 ,R/TP		
6	R380	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R400	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R401	RES,CHIP,MAKER	ERHZ0000530	5.1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R402	RES,CHIP,MAKER	ERHZ0000407	1000 Kohm,1/16W ,J ,1005 ,R/TP		
6	R403	RES,CHIP,MAKER	ERHZ0000493	51 Kohm,1/16W ,J ,1005 ,R/TP		
6	R404	RES,CHIP,MAKER	ERHZ0000405	10 Kohm,1/16W ,J ,1005 ,R/TP		
6	R405	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	R406	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R407	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R408	RES,CHIP,MAKER	ERHZ0000288	470 Kohm,1/16W ,F ,1005 ,R/TP		
6	R409	RES,CHIP,MAKER	ERHZ0000537	680000 ohm,1/16W ,F ,1005 ,R/TP		
6	R410	RES,CHIP,MAKER	ERHZ0000318	80.6 Kohm,1/16W ,F ,1005 ,R/TP		
6	R421	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R422	RES,CHIP,MAKER	ERHZ0000402	10 ohm,1/16W ,J ,1005 ,R/TP		
6	R424	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R425	RES,CHIP,MAKER	ERHZ0000443	2200 ohm,1/16W ,J ,1005 ,R/TP		
6	R426	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R427	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R428	RES,CHIP,MAKER	ERHZ0000499	5600 ohm,1/16W ,J ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R429	RES,CHIP,MAKER	ERHZ0000404	1 Kohm,1/16W ,J ,1005 ,R/TP		
6	R430	RES,CHIP,MAKER	ERHZ0000499	5600 ohm,1/16W ,J ,1005 ,R/TP		
6	R431	RES,CHIP,MAKER	ERHZ0000438	20 Kohm,1/16W ,J ,1005 ,R/TP		
6	R433	RES,CHIP	ERHY0013101	2.7 ohm,1/16W ,J ,1005 ,R/TP		
6	R434	RES,CHIP	ERHY0013101	2.7 ohm,1/16W ,J ,1005 ,R/TP		
6	R435	RES,CHIP,MAKER	ERHZ0000487	470 Kohm,1/16W ,J ,1005 ,R/TP		
6	R436	RES,CHIP,MAKER	ERHZ0000401	0 ohm,1/16W ,J ,1005 ,R/TP		
6	R437	RES,CHIP,MAKER	ERHZ0000435	20 ohm,1/16W ,J ,1005 ,R/TP		
6	RA400	RES,ARRAY,R	ERNR0000404	100 Kohm,100 Kohm,8 PIN,J ,1/16W ,SMD ,R/TP		
6	S300	CONN,SOCKET	ENSY0013501	8 PIN,ETC ,PUSH-PUSH TYPE / RECTANGULAR ,1.1 mm,TRANS FLASH SOCKET / EXTERNAL MEMORY CARD SOCKET		
6	SW100	CONN,RF SWITCH	ENWY0003301	,SMD ,0.4 dB,		
6	TR100	TR,BJT,ARRAY	EQBA0000601	UMT5 ,.2 W,R/TP ,		
6	U100	IC	EUSY0300501	QFN ,56 PIN,R/TP ,GSM, WCDMA Single RF Transceiver, 8X8X0.9		
□□		IC	EUSY0300502	QFN ,56 PIN,R/TP ,chartered,GSM, WCDMA Single RF Transceiver, 8X8X0.9 ,; ,IC,Tx/Rx		
6	U101	PAM	SMPY0014001	35.5 dBm,56 %, A, dBc, dB,6x6x1.15 ,SMD ,Tri Band		
6	U102	COUPLER,RF DIRECTIONAL	SCDY0003403	-18 dB,-.25 dB,-33 dB,1.0*0.58*0.35 ,SMD ,1920M ~ 1980M, 4pin, Pb Free , ,[empty] , , ,SMD ,R/TP		
6	U103	PAM	SMPY0014201	28 dBm,40 %,465 mA,-44 dBc,26.5 dB,4x4x1.1 ,SMD ,		
6	U104	IC	EUSY0073401	SSOP5-P-0.65A ,5 PIN,R/TP ,INVERTER, Pb Free		
6	U201	IC	EUSY0318401	CSP ,409 PIN,R/TP ,WEDGE Baseband Platform		
6	U300	IC	EUSY0306302	BCCS ,84 PIN,R/TP ,7x7, MSMC(1.2V), pbfree		
6	U301	IC	EUSY0332001	FBGA ,137 PIN,ETC ,512M(64Mx8) NAND+512M(16Mx32) SDRAM , ,IC,MCP		
6	U302	IC	EUSY0232812	SON1612-6 ,6 PIN,R/TP ,2.8V, 150mA LDO		
6	U303	IC	EUSY0319001	WDFN-8L ,8 PIN,R/TP ,300mA/300mA 2.8V/1.8V Dual LDO		
6	U305	IC	EUSY0238702	TSOPJW-12 ,12 PIN,R/TP ,3PORT Charge Pump(AAT2154 Low cost version)		
6	U400	IC	EUSY0250501	SC70 ,5 PIN,R/TP ,Comparator, pin compatible to EUSY0077701		
6	U401	IC	EUSY0300101	WQFN ,10 PIN,R/TP ,Small package Dual SPDT analog Switch, PB-Free		
6	U402	IC	EUSY0176401	MICRO8 ,8 PIN,R/TP ,1W AUDIO AMPLIFIER		
6	U500	FILTER,SEPERATOR	SFAY0007402	900.1800 ,1900.2100 , dB, dB, dB, dB,ETC ,1800GSM Quad, WCDMA2100 FEM, 5.4X4.0X1.2, Improved D5006		
6	U501	IC	EUSY0223001	HVSOF5 ,5 PIN,R/TP ,150mA CMOS LDO WITH OUTPUT CONTROL / 1.5V		
6	VA300	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA301	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		

11. EXPLODED VIEW & REPLACEMENT PART LIST

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	VA302	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA303	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA304	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA305	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA306	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA400	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA401	VARISTOR	SEVY0004001	18 V, ,SMD ,3pF, 1005		
6	VA402	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA403	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA404	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA405	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA407	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA408	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA409	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA410	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA412	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA414	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA430	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	VA490	VARISTOR	SEVY0004201	14 V, ,SMD ,120pF, 1005		
6	X100	VCTCXO	EXSK0005703	19.2 MHz,1.5 PPM,40 pF,SMD ,3.2*2.5*0.9 , ,; , ,1.5PPM ,2.8V ,3.2 ,2.5 ,0.9 , ,SMD ,P/TP		
6	X300	X-TAL	EXXY0004601	.032768 MHz,20 PPM,7 pF,65000 ohm,SMD ,6.9*1.4*1.3 ,		
5	SAFD00	PCB ASSY,MAIN,SMT TOP	SAFD0087801			
6	CN404	CONN,SOCKET	ENSY0020001			
6	LD400	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD402	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD403	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD404	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD405	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD406	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD407	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	LD408	DIODE,LED,CHIP	EDLH0006001	Blue ,1608 ,R/TP ,Blue SMD LED		
6	R411	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R413	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R414	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R415	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R416	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		

Level	Location No.	Description	Part Number	Spec	Color	Remark
6	R417	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R418	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R419	RES,CHIP	ERHY0003301	100 ohm,1/16W ,J ,1005 ,R/TP		
6	R423	RES,CHIP,MAKER	ERHZ0000406	100 Kohm,1/16W ,J ,1005 ,R/TP		
6	SPFY00	PCB,MAIN	SPFY0147601	FR-4 ,1.0 mm,BUILD-UP 8 ,		

11. EXPLODED VIEW & REPLACEMENT PART LIST

11.3 Accessory

Note: This Chapter is used for reference, Part order is ordered by SBOM standard on GCSC

Level	Location No.	Description	Part Number	Spec	Color	Remark
3	SBPL00	BATTERY PACK,LI-ION	SBPL0090501	3.7 V,950 mAh,1 CELL,PRISMATIC ,KU250 Europe BATT, IP, Pb-Free ,; ,3.7 ,950 ,0.2C ,PRISMATIC ,50x34x55 , ,BLACK ,Innerpack ,Europe Label	Black	35
3	SSAD00	ADAPTOR,AC-DC	SSAD0024501	100-240V ,5060 Hz,5.1 V,.7 A,CE ,AC-DC ADAPTOR ,; ,85Vac~264Vac ,5.1V +0.15V, -0.2V ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		
□□		ADAPTOR,AC-DC	SSAD0024502	100-240V ,5060 Hz,5.1 V,0.7 A,CE ,AC-DC ADAPTOR ,; ,5.1V +0.15V, -0.2V ,5.1V ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		
□□		ADAPTOR,AC-DC	SSAD0024503	100-240V ,5060 Hz,5.2 V,0.7 A,CE ,AC-DC ADAPTOR ,; ,85Vac~264Vac ,5.2±0.3V ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		
□□		ADAPTOR,AC-DC	SSAD0024504	100-240V ,5060 Hz,5.1 V,.7 A,CE ,AC-DC ADAPTOR ,; ,85Vac~264Vac ,5.1V(+0.15V, -0.2V) ,700mA ,5060 , ,WALL 2P ,I/O CONNECTOR ,		

Note